An Economic Analysis of Runway Extensions

July 2010

A Component of the

ALASKA Aviation System Plan

Prepared for
Alaska Department of Transportation and Public Facilities

WIth a Grant from
Federal Aviation Administration

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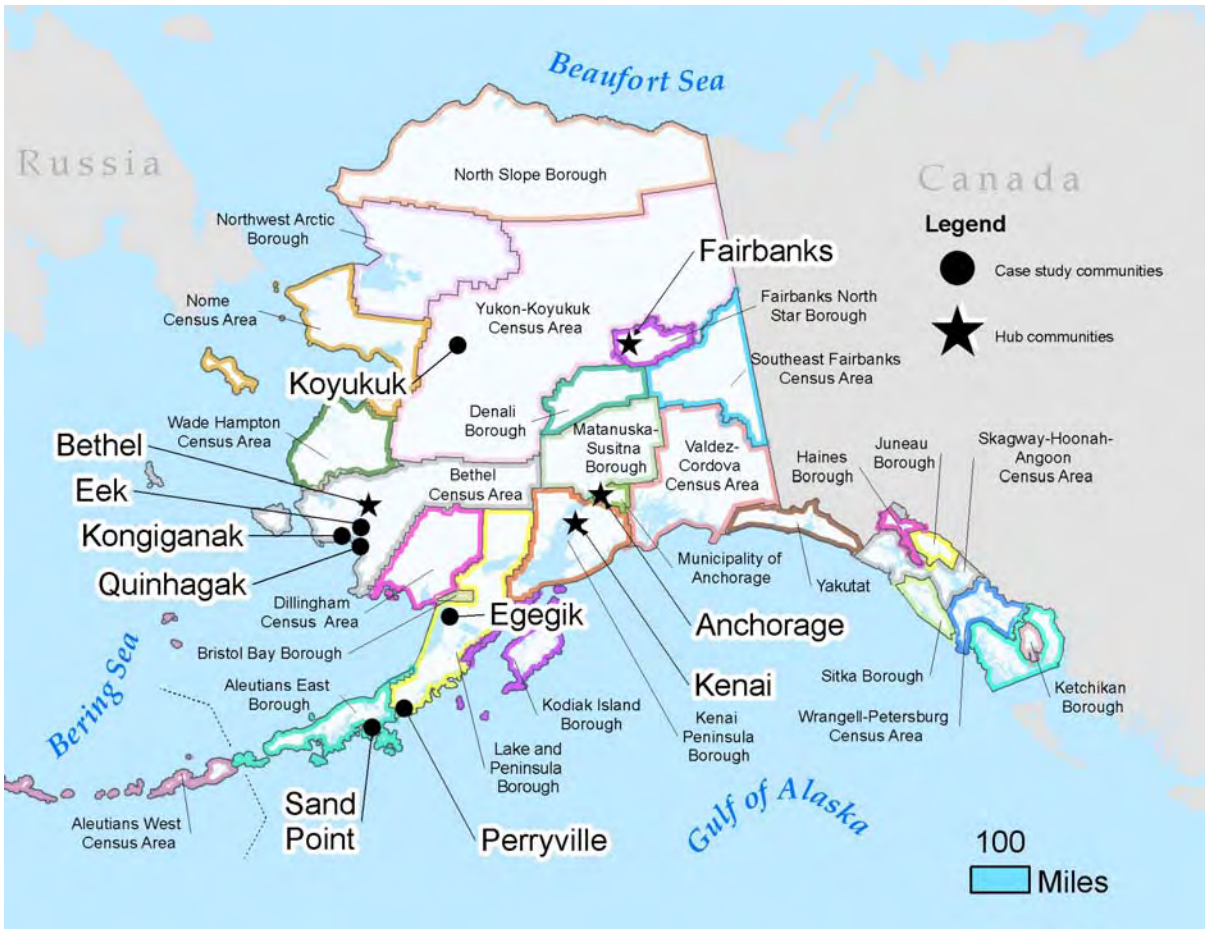
LIST OF ACRONYMS

ADOT&PF ..... Alaska Department of Transportation and Public Facilities
ACE..... Alaska Central Express
AVEC .....Alaska Village Electric Cooperative
CDQ .....Community development quota
CFEC .....Alaska Commercial Fisheries Entry Commission
DCCED .....Alaska Department of Commerce, Community, and Economic Development
FAA .....Federal Aviation Administration
FAR ..... Federal Aviation Regulation
ISER.....Institute of Social and Economic Research, University of Alaska Anchorage
NYMEX ..... New York Mercantile Exchange
OPIS.....Oil Price Information Service
PCE..... Power Cost Equalization
USPS .....United States Postal Service
YKSD .....Yukon Koyukuk School District

EXECUTIVE SUMMARY

The purpose of this project is to analyze the effect of longer runways on rural Alaska communities. The study evaluates the effect of runway length on economic development activities and community well-being by completing case studies of seven remote Alaska communities that have had or are expecting runway extensions: Eek, Egegik, Kongiganak, Koyukuk, Quinhagak, Perryville, and Sand Point (See Figure 1).

Figure 1. Geographic Locations of Case Study Communities



Source: Alaska Map Company, 2009.

The case studies presented in this report show that in order for a runway extension to enhance economic development in a community, there need to be existing economic activities prior to the runway extension—activities that will generate higher volumes of cargo or increase the number of passengers due to the lower per-unit transportation

costs associated with larger aircraft. Without such aviation-responsive economic activity, a runway extension has little effect on a community's economic development.

Community Benefits

Regardless of any significant impact on a community's economic development, longer runways provide numerous advantages. The case studies' results show that runway extensions create the following benefits for remote Alaska communities:

Improved Reliability and Safety

A runway extension can be critically important for improving air service reliability and safety, ensuring that residents of remote villages have access to medical services in case of an emergency situation. Improved operating reliability and public safety were reported by all case study communities and by some of the carriers operating in communities that had runway extensions. The benefits of improved reliability and safety may not be defined as traditional economic development benefits, but it is a common tenet that economic development and good transportation systems are closely related, and having a reliable and safe transportation system provides the basic foundation for economic development. Improved transportation systems do not guarantee economic growth, but if economic opportunities exist, good transportation systems can help foster additional economic activity.[1]

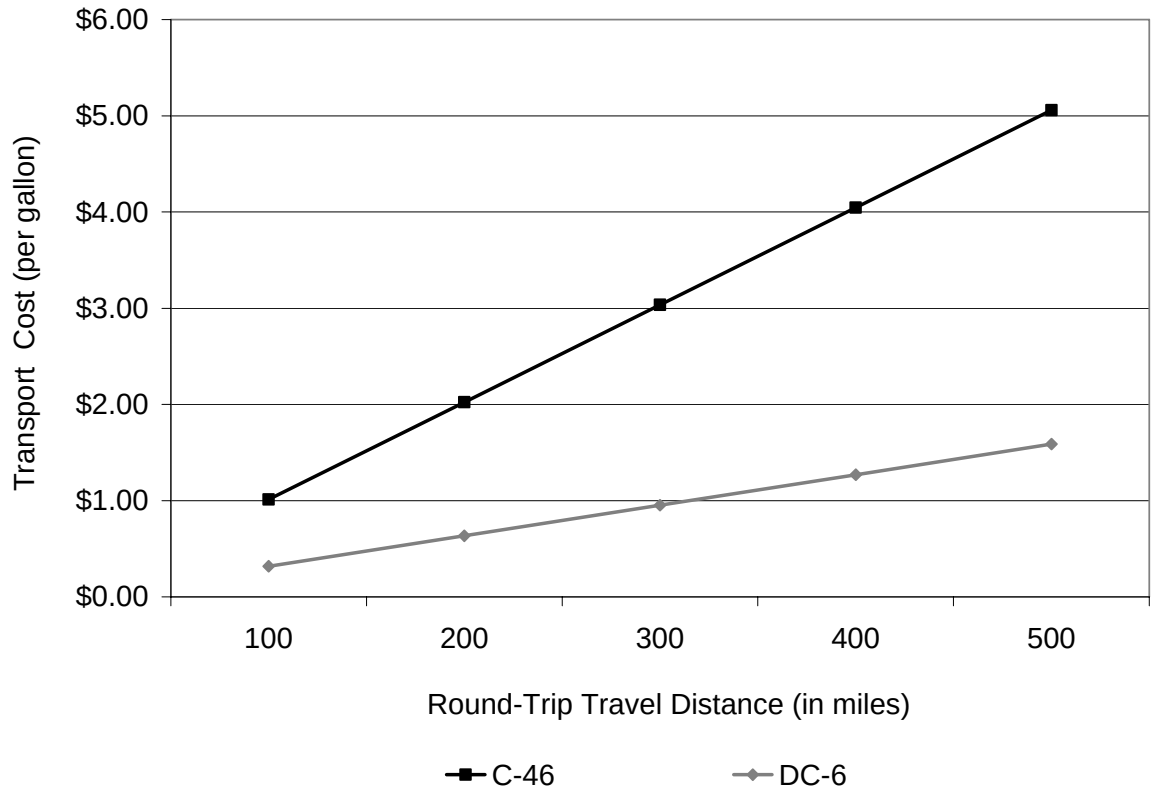
Reduced Fuel Transportation Costs

All of the case study communities receive fuel by barge two to three times each year. In general, barged fuel costs less than $1 per gallon for transport and is less expensive than flown fuel (Institute of Social and Economic Research, 2008). Nevertheless, three of the case study communities (Koyukuk, Egegik, and Perryville) experienced situations in the past two years where they needed to receive fuel by air. As demonstrated by the community case studies detailed in the report, the cost of transporting fuel by air decreases with a longer runway. Reduced cost of flying fuel to communities occurs

[1] It should be noted that this report focuses on data developed from air carrier reports and key informant interviews. The report does not assess the importance of runway extensions to non-air carrier businesses, the recreation sector, or government agencies.

when runways are upgraded to a length of 4,000 feet or greater (this length accommodates the DC-6). When runways are shorter than 4,000 feet and a C-46 (smaller aircraft) is used, fuel delivery costs by air are approximately $1.00 per gallon for a 100 mile round-trip (50 air miles from the fuel source). Air transportation costs for a DC-6 (larger aircraft) are substantially lower, reaching about $1.00 per gallon for a 300-mile round-trip. Depending on the distance to the community, the freight cost of transporting fuel with the smaller C-46 aircraft can add as much as $4.00 per gallon to the overall price of fuel (See Figure 2) (Adams, D. 2009).

Figure 2. Estimated Air Transportation Costs for Fuel



Source: Northern Economics, Inc. calculations based upon communications with Everts Fuel (Adams, D., 2009).

Note: Miles are in statute miles.

Other Benefits

During interviews, air carriers reported to the study team the long runways themselves are not a panacea (cure all), it is the economic development that may result from longer

runways that results in lower cargo rates. The volume of air cargo shipped has a much larger influence on costs than runway length for shipping air cargo to and from remote Alaska communities (Morgan, M., 2009). The community case studies in this analysis revealed that even if cost-savings occur, it is up to the air carrier to determine if these savings will be reflected in their rates and passed on to communities and individuals. The following benefits may be realized by air carriers due to a runway extension.

Reduced Cargo Transportation Costs

Reducing transportation costs for processed fish has been cited in the past by communities as an important reason for lengthening runways. Based on the results of the case study communities, the relationship between reduced transportation costs and increased airport activity, or for that matter, increased economic growth, appears to be highly dependent upon the existing economic activities and opportunities. For example, fishing communities such as Egegik and Sand Point have strong commercial fisheries that produce millions of pounds of seafood annually. In these communities with strong existing fisheries, a runway extension can make a difference in fish hauling costs. Even though commercial fish processors transport the majority of their fish by barge, some fresh fish is flown out, depending on the market conditions.

Table 1 shows the estimated cost difference of flying fresh fish out on a smaller plane versus a larger plane at Sand Point (i.e., before runway extension and after extension).[2] The volume of 100,000 pounds is used to illustrate the potential cost difference since the exact amount of fish flown out of each community is unknown.

[2] Smaller loads in Sand Point are handled by Alaska Central Express using a Beech 1900, or by Peninsula Airlines with a Cessna 208 Caravan or Fairchild Metroliner III. Larger aircraft could include Everts' DC-6 or the Hercules C-130 operated by Lynden Air Cargo.

Table 1. Estimated Cost Difference for Shipping 100,000 Pounds of Fish

Community	Amount shipped	Small plane	Large plane	Cost difference
Sand Point	100,000 pounds	**$0.80/pound** $80,000	**$0.50/pound** $50,000	$30,000

Source: Calculations based on communications with Coastal Villages Seafoods (Hall, J., 2009) and Aleutia (Cumberlidge, B., 2009).

Reduced Cargo Shipping Costs

Runway length may affect economic development by decreasing the cost of shipping cargo to and from communities; however, high volume shipments are necessary for this benefit to be experienced by rural communities (Morgan, M., 2009). For example, cargo shipping costs may decrease when a community is completing a large capital improvement project. In general, however, air carriers are unlikely to change their freight rates for day-to-day shipments after a runway extension (Morgan, M., 2009 and Thurston, P., 2009).

If cargo volume is sufficient to justify the use of larger aircraft, the cost savings as compared to the use of smaller aircraft are considerable. For example, prior to the 2002 runway extension, Arctic Transportation could only use its Cessna 207 in Eek, and had to restrict payloads to 1,000 pounds. After the extension, it could fly in its CASA 212—an aircraft with a 5,000 pound payload. Table 2 shows a comparison of flying freight with a Cessna 207 and a CASA 212 based on April 2009 costs provided by Arctic Transportation. The cost comparison for shipping 5,000 pounds and 100,000 pounds is based on flying freight between the regional hub of Bethel and a hypothetical community in the region located 80 miles from Bethel using a chartered aircraft making a round-trip between the two airports.

Table 2. Changes in Shipment Costs to Eek

	Payload (Pounds)	Hourly operating cost	Per-pound shipping cost[3]	Delivery cost estimate (based on one hour of travel)	
				5,000 pounds	100,000 pounds
Cessna 207	1,000	$525	$.52	$3,900	$78,000
CASA 212	5,000	$2,100	$.42	$2,100	$42,000
Difference ($)				$1,800	$36,000
Difference (%)				-46%	-46%

Source: Northern Economics, Inc. calculations based upon communications with Arctic Transportation (Brown, M., 2009).

Note: Payload amount per plane is based on estimates provided by Arctic Transportation. Also, the Cessna 207 flies at 110 knots per hour, so it is assumed to take 1.5 hours round-trip for the Cessna 207 and 1 hour round-trip for the CASA 212, which travels at 160 knots per hour.

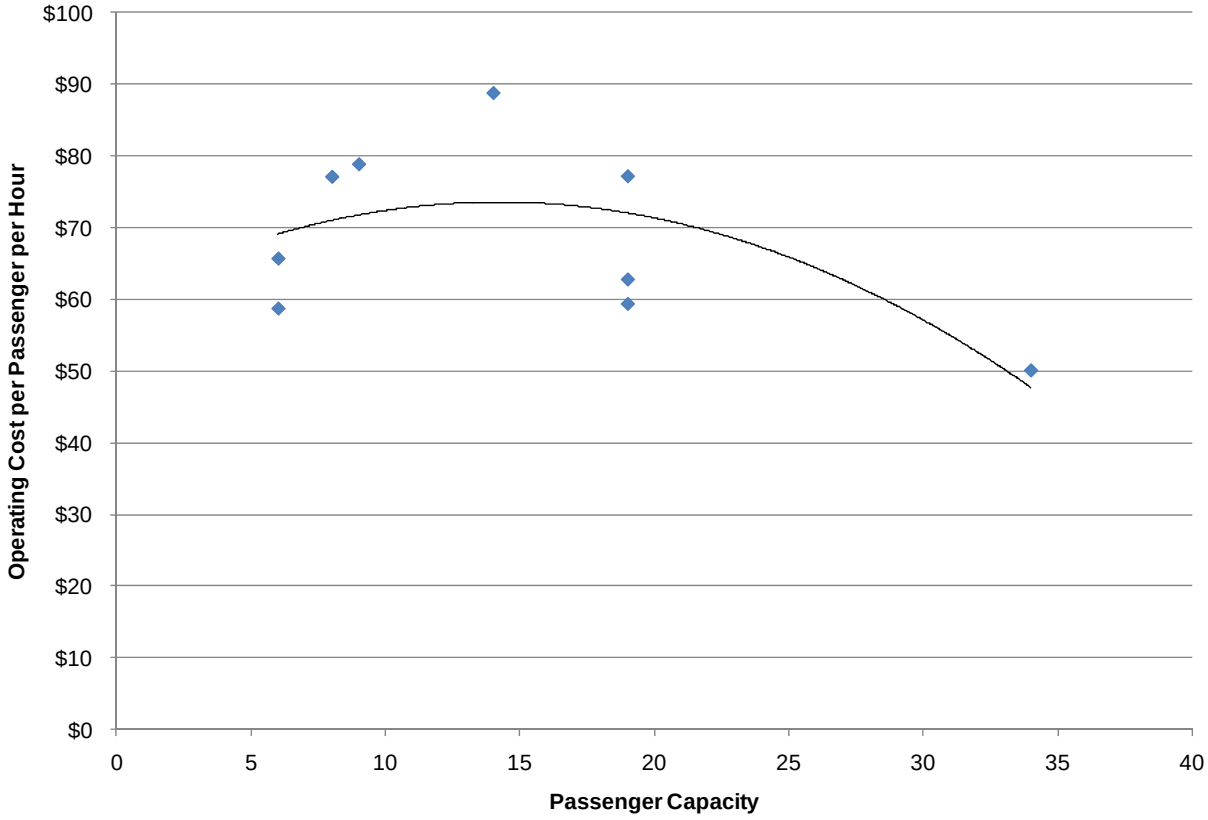
Reduced Operating Costs and Passenger Flights

A runway extension could also reduce operating costs for passenger travel, cargo shipping and receiving (including fresh fish), and bypass mail service. Total cost savings to an air carrier from a runway extension are based on potential equipment changes and the volume of passengers, cargo, or mail the carrier transports. Even if cost savings occur, there is no guarantee that these savings will affect passenger fares or cargo rates—this would depend on the market for services (i.e., competitive pricing) or the negotiation of a high-volume price between customer and carrier.

In order to present the potential impact of higher volumes on carrier costs, the study compared direct operating costs per passenger of aircraft used in the case study communities and the number of passengers per aircraft (see Figure 3). In general, past a certain point, operating costs per passenger fall as aircraft become larger. A runway extension will not automatically result in a larger aircraft being used and lower air fares; the volume of passengers must be great enough to financially support using the larger aircraft.

[3] The per-pound shipping cost is the hourly operating cost divided by the payload.

Figure 3. Direct Hourly Operating Cost per Passenger



Source: Northern Economics, Inc. calculations based U.S. Department of Transportation, Bureau of Transportation Statistics. Form 298-C, Schedule F-2 - Alaskan Carriers - Report of Aircraft Operating Expenses and Related Statistics. 2008.

While a larger runway does not guarantee the use of larger aircraft, data from the Bureau of Transportation Statistics indicate that between 2002 and 2008, the total number of passengers and the average number of passengers per flight increased by larger percentages in the case study communities that received runway extensions than they increased in comparative Alaska communities that did not receive runway extensions during that period.[4] While the number of flights dropped by nearly 40 percent for both community groups, case study communities saw a 79 percent increase in the annual number of passengers compared to just 16 percent in the comparison group. This increase in the number of passengers resulted in a 197 percent increase in the

[4] The comparative communities without extended runways include Tununak, Nelson Lagoon, Kwigillingok, Old Harbor, Togiak, King Cove, Beaver, Hughes, Eagle, and Grayling.

number of passengers per flight compared to an 84 percent increase in the comparison group (see Table 3).

Table 3. Passengers, Flights, and Passengers per Flight by Comparative Groups

Category	Change from 2002 to 2008	
	Comparative Communities with No Runway Extension	Case Study Communities with Runway Extensions
Number of Passengers	16%	79%
Number of Flights	-37%	-40%
Number of Passengers per Flight	84%	197%

Source: Northern Economics, Inc. calculations based U.S. Department of Transportation, Bureau of Transportation Statistics. 2009.

As noted, the number of flights declined in both community groups; this change was coupled with an increase in the average number of seats available per passenger flight in both groups. In 2002, communities with extended runways and those without runway extensions had nearly the same number of seats available per flight. However, by 2008 communities with runway extensions saw their average number of seats available per flight nearly triple while the average number of seats available per flight in communities without extended runways only doubled (Table 4). The data indicate changes in the composition of service fleets for both groups, but that communities with runway extensions were served by even larger aircraft after their runway extensions.

Table 4. Average Seats per Passenger Flight, 2002 and 2008

Year	Comparative Communities with No Runway Extension	Case Study Communities with Runway Extensions
2002	24	23
2008	46	68
Percent Increase	94%	196%

Source: Northern Economics, Inc. calculations based U.S. Department of Transportation, Bureau of Transportation Statistics. 2009.

The Bureau of Transportation Statistics data show that all of the case study communities experienced increases in passengers and passengers per flight after their runway extensions; however, the magnitude of these changes was not uniform across the communities. Perryville saw the smallest change percentage increase in the number of passengers (18 percent) while Eek saw a 111 percent increase. Koyukuk saw a 59

percent increase in the numbers of passengers per flight, while Sand Point saw a 416 percent increase, which was driven by a 60 percent drop in the number of flights (see Table 5).

Table 5. Percent Change in Passengers, Flights, and Passengers per Flight by Case Study Community after Extensions

Category	Eek	Egegik	Kongiganak	Koyukuk	Perryville	Quinhagak	Sand Point,
Passengers	111	19	50	58	18	94	109
Flights	-35	-65	-46	0	-36	-43	-60
Passengers/Flight	225	239	176	59	85	242	416

Source: Northern Economics, Inc. calculations based U.S. Department of Transportation, Bureau of Transportation Statistics. 2009.

KEY FINDINGS

The results of the community case studies completed for this analysis show that in order for a runway extension to increase the economic development of a community, there must be economic activities prior to the runway extension that will generate higher volumes of cargo or numbers of passengers due to the lower transportation costs associated with larger aircraft using the runway. Without such aviation-responsive economic activity, a runway extension has little effect on a community's economic development.

However, the case studies' results show that runway extensions create the following potential benefits for remote Alaska communities:

- Improved service reliability
- Increased safety
- Reduced cost of flying fuel to communities

A runway extension can be critically important for improving the reliability and safety of air service at an airport. For remote villages, air service is the only way to access emergency medical services, so improved air service reliability has the potential to save lives. In addition, a runway extension can be very important for communities that rely on air transportation of fuel by allowing larger planes to access the airport, which can

reduce the per-gallon cost of flying the fuel to the community. The improved reliability of air carrier service from a runway extension also increases the likelihood that fuel can be delivered quickly when shortages unexpectedly arise. In the long run, improvements to the state's transportation infrastructure can make a significant reduction in the cost of importing energy and other goods, which would then result in lower living costs and higher standards of living.

Runway extensions create additional potential benefits for air carriers:

- Reduced cargo shipping/transportation costs
- Reduced operating costs for passengers and bypass mail flights.

These benefits are more dependent on the volume of cargo/mail/passengers transported than a runway extension itself. If volumes support the use of larger aircraft, a runway extension would enable carriers to realize economic efficiencies to transport cargo, mail, and passengers. It would be at the discretion of the carriers to pass those cost savings on to the customers (the communities).

Runway length is a critical element of airport planning and development. The 1996 Alaska Aviation System Plan recommended a runway length for Community Class Airports of 3,000 feet. The statewide standard for Community Class runway lengths was changed from 3,000 feet to 3,300 feet in response to Change 6 in FAA Advisory circular 150-5300, which required a runway length of 3,200 feet for non-precision instrument flight approaches. The department's 3,300-foot statewide standard resulted from an additional 100 feet being added to the 3,200-foot minimum FAA standard, to accommodate variation in temperature and elevation. The 3,300-foot minimum standard has since guided airport development at many rural airports.

This analysis does not find a single runway length which guarantees all of the potential benefits discussed in this report to every community. Because the actual benefits realized by a community are dependent on a great many factors, the state may choose to evaluate runway length requirements for each airport on a case-by-case basis. Airport master plans, airport layout plans, and regional transportation plans may

consider airport and community-specific factors such fleet mixes, stage lengths, elevations, temperatures, economic vitality, and other factors in determining the most appropriate runway length for each community.

Main Report Body

1.0 INTRODUCTION

Airports are the lifeline of Alaska's transportation system, and are often compared to the highway and interstate system that spans the lower 48 U.S. States. The ability of each airport to adequately serve its community and surrounding area is based upon several factors including airport infrastructure, available employees, and transportation services provided by airline companies.

The type of air service provided by airline companies to a community is dependent upon the community's demand for passenger, cargo, and fuel service, and the runway infrastructure (i.e., the type, length, and safety features of the airport runway). Air service provided to a particular community may be interdependent with the service provided to other Alaska communities served by the same air carrier along a specific air route. As described in the Northwest Alaska Transportation Plan, the ability of any air carrier to serve multiple communities on any one route will depend on the service limitation (usually runway length) of the most constraining airport (ADOT&PF, 2004). The fleet mixes of the air carriers serving a region can also affect air service for remote communities (Chapman, J., 2009). Just because a runway is extended does not mean different aircraft will be utilized; upgrading aircraft and changing the fleet mix is an expensive endeavor for air carrier businesses.

The high cost of living in rural Alaska has been a challenge faced by many communities in recent years. As transportation and energy costs have increased, many rural Alaskans have had to make tough decisions about how to best allocate their resources. Having an efficient transportation option can help reduce the cost of transporting cargo and fuel to rural communities and can also help rural communities compete in the global marketplace for seafood, tourism, and art, to name a few rural Alaska products.

The purpose of this report is to examine the effect of runway length on economic development in rural Alaska communities and on community costs. A large part of this analysis examines the relationship between runway length and transportation costs for rural communities, and the effect of runway length on seafood products, other rural businesses, and energy costs in rural Alaska.

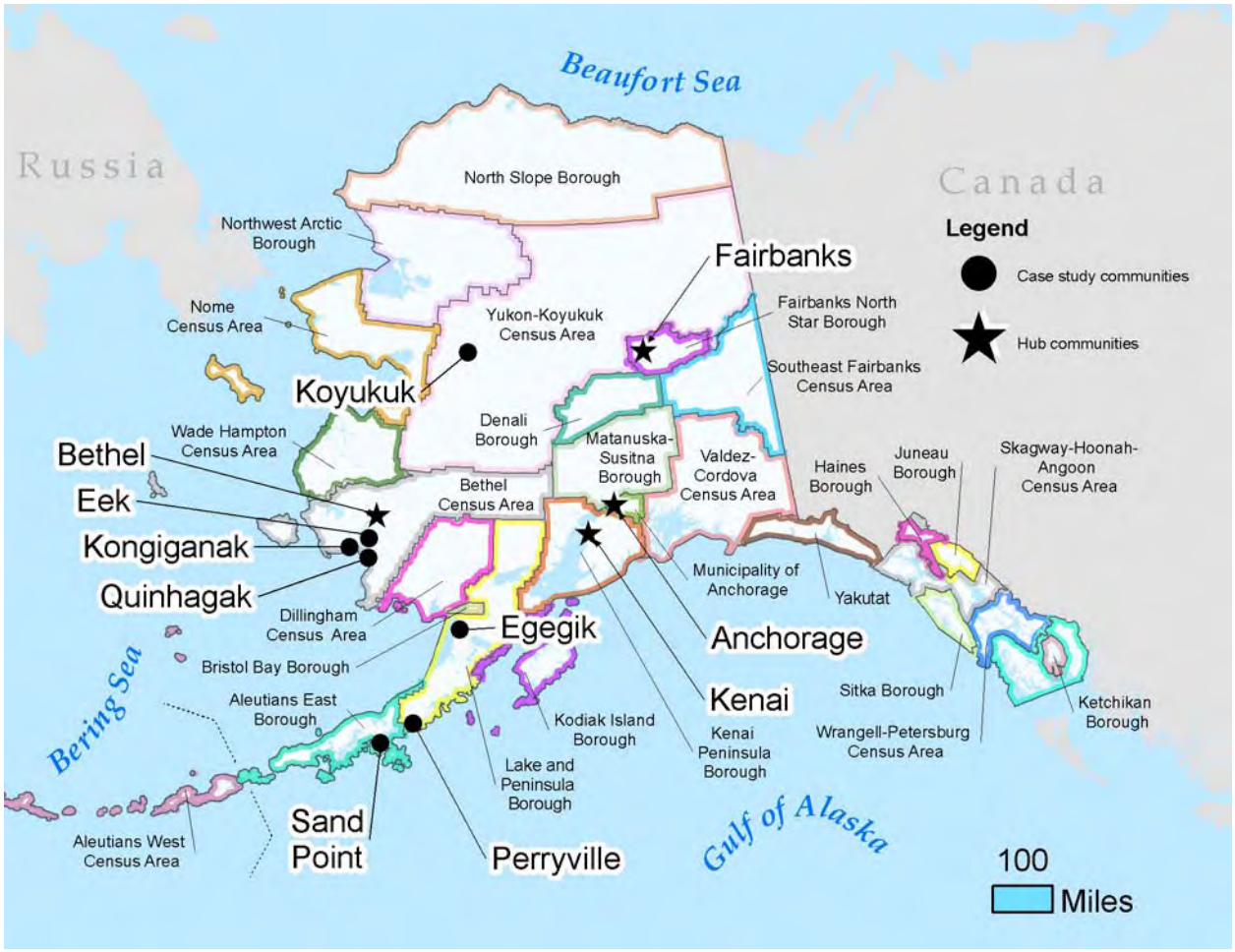
In order to illustrate the effect of airport runway length on rural communities, this report presents case studies of several rural Alaska communities. The case studies describe each community's local economic conditions, and present information on airport activities. The study team held conversations with community leaders to better understand the role of the airport in the community, and the effect of runway length on economic activities.

Community case studies were completed for:

- Eek
- Egegik
- Kongiganak
- Koyukuk
- Perryville
- Quinhagak
- Sand Point

The locations of the case study communities are shown in Figure 4.

Figure 4. Map of Case Study Communities



Source: Alaska Map Company, 2009.

The community case studies are presented in Section 3 of this report. The case study of each community is organized in a similar manner beginning with a brief introduction to the community, followed by a review of the community's airport and public infrastructure, and then a description of the community's economic conditions. The airport and public infrastructure section reviews the airport conditions and then describes the public infrastructure related to transportation activities and fuel delivery. The local economy section reviews economic activities in the case study community, and identifies growth areas that could be tied to increased airport activity. The potential economic activities are further explored in the next section focusing on air carrier activities including a review of passenger, cargo, and bypass mail volumes. This section focuses on changes in activity levels that may have occurred since the runway

extension was completed, or could potentially occur if or when a runway extension is completed. Each case study concludes with a summary of the impacts of the runway extension on the community

The following section of this report provides background information necessary to understand the role of airports, and in particular, runways within rural Alaska communities. Three topics are covered: fuel, commercial fishing, and mail. This information is provided prior to the case study analysis because it provides background information necessary for understanding some of the challenges faced by the case study communities. The background section is followed by the case studies for each of the communities identified above.

2.0 BACKGROUND

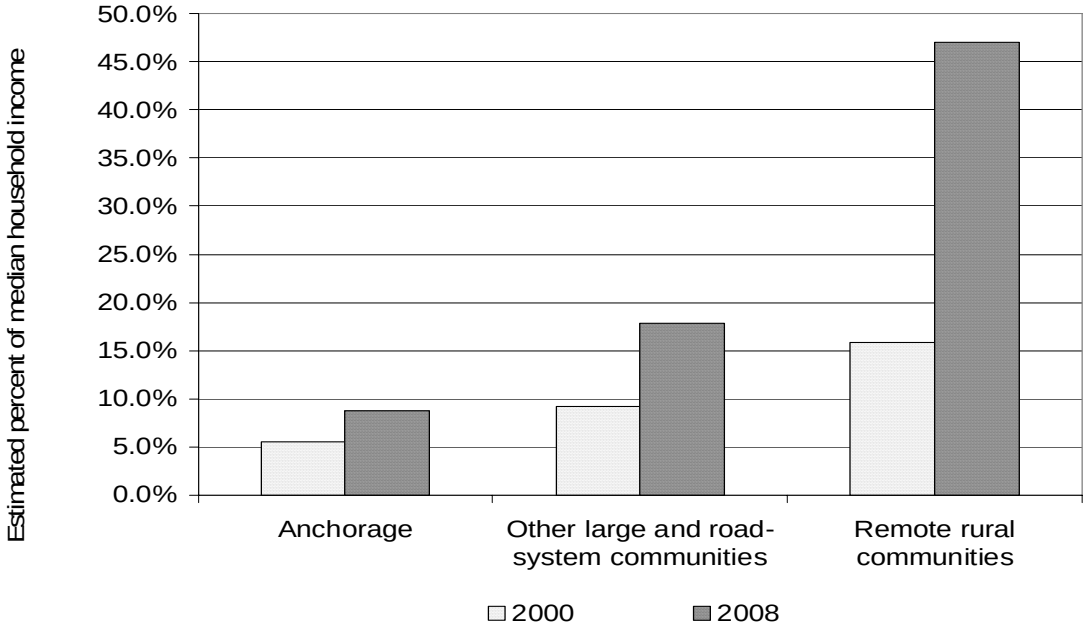
Economic development and transportation often go hand in hand. Improved transportation networks do not guarantee economic growth, but they can foster it. Conversely, increased economic development in an area can create the need for better transportation services. There is a definite, meaningful connection between economic growth and transportation networks. The following sections provide background information on three activities in rural Alaska that frequently utilize the rural airport: fuel transportation, shipment of fish, and bypass mail.

2.1 Fuel

Concern over the high cost of fuel in rural communities has grown along with a dramatic increase in fuel prices. People living in the remote areas of Alaska require large quantities of fuel for heat, electricity, and transportation. The University of Alaska's Institute of Social and Economic Research (ISER) recently completed a study analyzing the cost of delivering fuel to rural Alaska communities; the original study was completed in 2008 and updated in 2009 (ISER, 2008 and ISER, 2009).

As shown in Figure 5, estimated household cost for energy use in remote rural Alaska has increased significantly since 2000, from approximately 16 percent of total household income to 47 percent in 2008 for the lowest income households (ISER, 2009). The average annual energy expenditure per household in rural Alaska is more than three times the U.S. average, while at the same time per capita income is less than 75 percent of the U.S. average (ISER, 2008). This disparity, and the cold Alaska climate, results in rural Alaska households spending a substantially higher portion of their income on fuel.

Figure 5. Comparison of estimated percent of median household income spent on home energy consumption in Alaska, 2000 and 2008



Source: Saylor B., Haley, S. and N. Szymoniak. Estimated Household Costs for Home Energy use, May 2008. University of Alaska, Anchorage, Institute for Social and Economic Research.

The price of crude oil is a very significant factor for determining the price of petroleum products. The prices of gasoline and diesel—and especially the changes in those prices—are largely determined by the worldwide demand for and supply of crude oil. Shifts in overall supply and demand and specific international events also affect oil prices and price volatility. Regional and local markets for refined products are also influenced by the level of competitiveness in these markets and the costs of distribution to end users.

The delivered price of fuel for Alaska communities includes:

- World price of crude oil
- Refining cost (typically at Alaska or West Coast refinery)
- Transportation cost (typically truck, railroad, barge or air)
- Storage and distribution costs
- Taxes (federal, state and local)
- Other (including subsidies and abnormal profits) (ISER, 2008)

Over the past 10 years, real oil prices have increased dramatically, responding to shifts in supply and demand as well as the influence of global and regional turmoil. There is no price for Alaska crude oil on the New York Mercantile Exchange (NYMEX) or other commodity exchanges. Instead, the price paid for Alaska crude oil (Alaska North Slope crude oil) is calculated by subtracting a market differential for quality from the price of West Texas Intermediate quoted on the NYMEX (ISER, 2008). As shown in Table 6, Alaska crude oil prices ballooned in 2007 and 2008, increasing from around $51 in January 2008 to between $90 and $130 per barrel the following year. Since December 2008, Alaska crude oil prices have been between $37 and $48 per barrel.

Table 6. Alaska Monthly Crude Oil Prices, ($ per barrel)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2000	$25.74	$27.65	$28.01	$23.83	$27.15	$29.62	$27.63	$29.40	$32.25	$31.56	$32.74	$23.72
2001	$24.37	$26.02	$24.70	$25.55	$26.70	$25.82	$24.60	$24.12	$23.21	$19.45	$17.23	$16.69
2002	$17.52	$19.14	$22.76	$24.99	$25.87	$24.16	$25.82	$27.39	$28.76	$27.53	$24.69	$28.03
2003	$31.91	$35.20	$32.59	$25.59	$26.19	$29.35	$29.17	$30.22	$27.09	$28.55	$29.11	$30.67
2004	$33.1	$33.66	$35.50	$35.43	$39.07	$36.73	$39.44	$43.12	$42.71	$48.56	$42.15	$36.66
2005	$41.12	$43.59	$50.63	$49.75	$46.77	$53.67	$56.67	$62.40	$63.47	$60.37	$56.11	$57.17
2006	$62.85	$59.26	$60.61	$67.74	$69.32	$69.50	$73.10	$71.74	$62.33	$54.27	$54.26	$58.13
2007	$51.52	$57.00	$59.01	$63.92	$64.76	$69.11	$75.93	$73.83	$79.72	$84.77	$92.98	$88.64
2008	$91.16	$94.42	$105.06	$112.37	$125.41	$133.78	$132.87	$115.98	$101.86	$73.65	$53.94	$37.70
2009	$39.01	$42.78	$47.75	$46.56								

Source: Alaska Department of Revenue, Tax Division, 2009. Available at: http://www.tax.alaska.gov/programs/oil/oilprices/ans.aspx. Accessed June 3, 2009.

Fuel products in Alaska are transported in a variety of ways from the refinery to fuel terminals, and from terminals to communities (ISER, 2008). Barging fuel is a challenging, yet common approach in much of remote Alaska, including the Kuskokwim River area, Yukon River, Northwest Alaska and Kobuk River, and the Arctic region. Barged fuel costs are based on a refined fuel cost that is tied to a fuel price index such as the Oil Price Information Service (OPIS) Anacortes price, plus a delivery charge.

Flying fuel is the most expensive method for transporting fuel to rural Alaska villages (ISER, 2008). **Communities will generally only fly in fuel if they do not have access to navigable water that would allow fuel to be barged in, or in an emergency when fuel supplies run low in the spring and ice conditions preclude water transport.**

Everts Fuel is the largest commercial air service that flies fuel in Alaska. It operates two types of fuel planes: the larger are DC-6s that can carry 5,000 gallons of fuel (see Figure 6), while its smaller planes are C-46s that can carry around 2,000 gallons of fuel per trip. According to Everts Fuel, the operation of these aircraft will continue for many years because Federal Aviation Regulations (FAR) that apply to fuel transport are different from air cargo transport; Part 121 of the Code of Federal Regulations Title 14 allows aircraft engines to be used for more than 250,000 hours when they are transporting fuel (Adams, D., 2009). Everts has a stockpile of DC-6 aircraft and parts, so they plan to repair and replace their DC-6s (with additional DC-6 aircraft) for many years to come. According to Everts, lowest cost fuel delivery is achieved when an airport has at least a 4,000 foot runway—the minimum runway length for transporting fuel using a DC-6 (Ragar, R., 2009).

Figure 6. Everts Air Fuel DC-6

Source: Sergeant Rick Rifley, undated.

In general, distance and payload are major factors in final fuel prices paid, but the appropriate payload or amount of fuel delivered to a community depends on the community's population, thus its demand for fuel delivery. Larger deliveries to more populous communities mean that delivery costs are spread across more gallons. However, Everts Fuel noted that it often doesn't make sense to make large fuel

deliveries to some of Alaska's smallest communities because they do not need, and may not have the storage capacity for large quantities of fuel (Ragar, R. 2009).

On average, when fuel is flown to a community, the delivery cost ranges between $1.00 and $5.00 per gallon depending upon the distance to and amount of fuel delivered to the community and, subsequently, the size of aircraft used for the delivery (ISER, 2008, and Adams, D. 2009). When fuel is flown in using larger planes, such as the DC-6, the delivery cost is approximately $0.35 per gallon per 100 miles. With smaller planes, such as the C-46, the delivery cost is $0.65 ***more*** per gallon per 100 miles, or around $1.00 per gallon per 100 miles. Depending on the distance to the community, the freight cost of transporting fuel with the smaller C-46 aircraft can add as much as $4.00 per gallon to the overall price of fuel (Adams, D. 2009).

Fuel that is barged to communities and stored for use throughout the year is typically purchased and delivered twice a year—spring and fall—although some communities only receive one delivery per year. The price at which fuel is purchased in either season is the price paid throughout the rest of the year. A unique situation occurred in 2008 because summer and fall fuel prices were extremely high and even though fuel prices decreased over the winter months, communities that purchased their fuel in the summer or fall continued to pay the high prices throughout the winter. According to Jim Young at Everts, the falling cost of fuel over the winter caused the unique situation where flown-in fuel in the spring of 2009 was less expensive than barged fuel from the summer of 2008. For example, in the community of Donlin Creek, Alaska, fuel delivered by barge was approximately $6 per gallon in summer 2008. During the spring of 2009, fuel prices had declined such that fuel flown from Kenai to Donlin Creek was around $4.85 per gallon (Young, 2009).

2.2 Fish and seafood industry

The fishing industry in Alaska is changing in concert with global competition and market conditions. Fresh seafood is becoming an attractive growth area to the industry with its high margins and opportunities for selective marketing. Sand Point fishers and

processors are engaged in this market with deliveries of fresh seafood throughout the U.S. and to a number of foreign countries, including South Korea and Japan.

Alaska is by far the largest fish harvesting state within the United States. Based on total commercial fish landings in 2007, the United States harvested approximately 9.2 billion pounds of fish. Alaska alone accounted for 58 percent of this amount, or 5.3 billion pounds of fish (NMFS, 2008). Within Alaska, the largest ports in terms of commercial fish landing amounts are Dutch Harbor/Unalaska (777.2 million pounds), Naknek-King Salmon (115.6 million pounds), and Ketchikan (83.5 million pounds).

Transportation is one of the biggest challenges facing village fish processing plants. It costs more—sometimes much more—to ship fish products to U.S. or foreign markets from most western and interior Alaska villages than it does from processing plants on the coast of southeast or south-central Alaska (Knapp, G., 2001). It also costs more to bring in supplies and to pay for the energy costs related to processing fish in more isolated locations of the state. Higher transportation costs can make it difficult to compete with processors that have easy access to high volumes of fish and are more closely located to shipping hubs.

For example, fishing communities located along Prince William Sound are able to truck their freshly caught fish to Anchorage and ship to Seattle on large jets for approximately $0.30 to $0.40 per pound. In contrast, processors from more remote locations in Alaska may spend around $1.00 per pound just getting their fish to Anchorage (see Figure 7), and have to incur the same $0.30 to $0.40 per pound charge to ship their fish on to Seattle (Cumberlidge, B., 2009).

Figure 7. Loading Salmon at Quinhagak

Source: Coastal Villages Region Fund, 2008

As with all commodity markets, the price paid for fresh fish changes often. Last year in Seattle, processed fish was being purchased (for retail markets) at $4.50 per pound fresh or $3.25 per pound frozen. Suppliers of the fresh fish are competing on margins, so the differences in transportation costs can have a large influence on processors' profits; if processors are able to save even $0.25 or $0.50 per pound by transporting their fish out on a larger aircraft, it makes a large difference to their profit margins.

The specific details of transportation costs for the communities of interest are explored in the community case studies in Section 3.

2.3 Cargo and Mail Service

The United States Postal Service (USPS) is a major source of airfreight in rural Alaska, moving non-priority mail to villages on a regular basis. Older planes are often used to provide cargo service to rural communities (see Figure 8). The USPS is mandated to

provide “uniform and universal services” to all locations in the country (Fried, N., and Keith. B, 2005). The air transportation system acts as a “wholesale-to-retail” distribution system moving groceries and consumer goods throughout the regions (ADOT&PF, 2004). The mail moves under a special provision in federal law that permits and subsidizes air delivery of non-priority mail to remote Alaska. Rates are about 20 to 40 percent of private air cargo rates.

Figure 8. DC-4 Cargo Plane

Source: Sergeant Rick Rifley, undated.

The bypass mail system that serves rural Alaska was established soon after aviation-based non-priority mail service to rural Alaska started because mail volumes began to overwhelm postal facilities in Anchorage (ADOT&PF, 2004). In 1985, the USPS began the bypass mail system, in which mail moves directly from certified distributors to communities without going through a postal facility (thus bypassing the Post Office). Instead, certified distributors fill orders exceeding 1,000 pounds, stamping them as non-priority mail, and placing them on pallets designated for a specific community. The palletized shipment is taken to the air carrier providing service to the community, and it becomes the air carrier’s responsibility to deliver the mail directly to the recipient in the community. The USPS stipulates that the mail be delivered from a hub to the outlying community within one day of receipt at a hub (ADOT&PF, 2004).

About 80 percent of non-priority mail to remote Alaska goes by bypass mail. The other 20 percent of non-priority mail (packages adding up to less than 1,000 pound pallets) moves through the usual Post Office process and travels on regularly scheduled passenger aircraft to the hubs, where it is then moved to the air carrier who delivers it together with the bypass mail (Deaton, S., 2009 and ADOT&PF, 2004). Bypass mail provides the lowest rates for moving most goods, including groceries and other staples, to communities without road access. Stores in rural Alaska depend largely on receiving their goods through non-priority mail. Although the customer pays the same non-priority postage paid elsewhere in the United States, the cost to USPS to deliver the mail is much greater since the non-priority rates are based on standard ground delivery costs for the entire USPS system and mail travels by more expensive air modes in Alaska rather than on surface routes. The rural Alaska mail system costs approximately $154 million annually—this is the amount USPS pays air carriers to deliver mail to rural Alaska (Stapleton, R., 2009).

Since bypass mail service began in the 1980s, mail volumes have increased threefold. On average, across Alaska, between 500,000 and 2 million pounds of mail are delivered to each community every year (Stapleton, R., 2009). Mail volume to a community averages about one ton per resident per year. According to the USPS, approximately 120 million pounds of bypass mail was delivered in Alaska in 2007, and 125 million pounds was delivered in 2008 (Stapleton, R., 2009).

Bypass mail is a constant source of business for many Alaska air carriers, and helps subsidize passenger service to rural communities (Singsaas, D., 2009). Since the 1980s, passenger traffic on these mail delivery flights has more than doubled. This increase is largely due to a requirement by the Rural Service Improvement Act that passenger carriers to remote Alaska communities are allotted 70 percent of the bypass mail and air freight carriers are allotted 30 percent. Under the bypass mail program, passenger carriers need a 10 percent market share to qualify to carry bypass mail and freight carriers need a 25 percent market share to carry bypass mail (U.S. Postal Service, 2007).

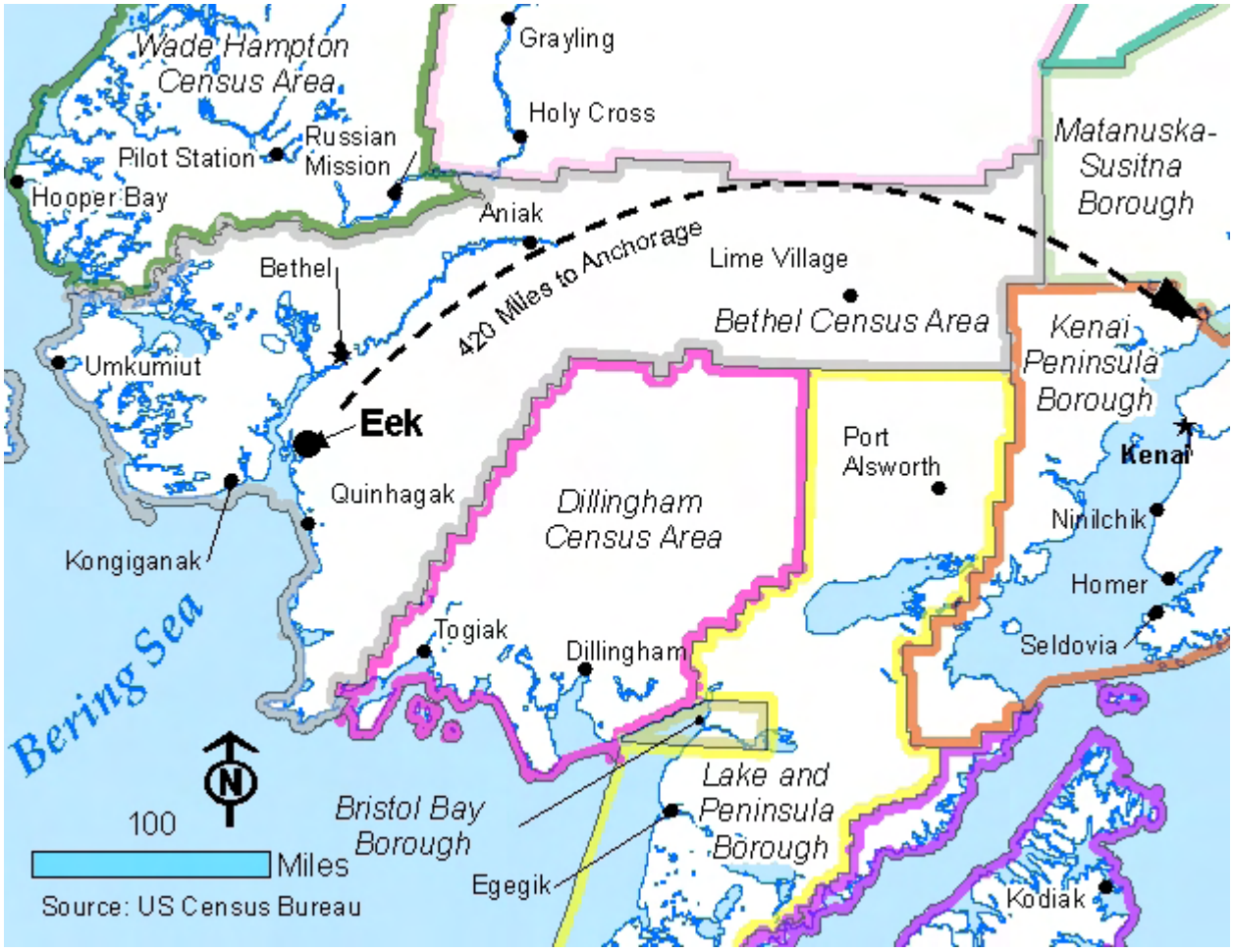
3.0 COMMUNITY CASE STUDIES

The following subsections are the community case studies completed to evaluate the effect on economic development of runway extensions. The case studies are discussed in alphabetical order on the following pages.

3.1 Eek, Alaska

Eek, Alaska is a community of 272 residents located on the south bank of the Eek River, 12 miles east of the mouth of the Kuskokwim River (DCCED, 2009). It is 35 air miles south of Bethel in the Yukon-Kuskokwim Delta and 420 miles west of Anchorage. The Yukon-Kuskokwim Delta region is an area known for its large river delta, dotted with wetlands, which exist in a harsh Arctic climate. The tundra covered soil on top of often very thin permafrost is not conducive to road construction or maintenance; thus, travel is by boat and aircraft in the summer and by aircraft and snowmobile on marked trails in the winter (ADOT&PF, 2002). Figure 9 provides a map of Eek in relation to the greater Yukon-Kuskokwim Delta region.

Figure 9. Geographic Location of Eek



Source: Alaska Map Company, 2009.

The community of Eek is a traditional Yup'ik Eskimo village with a subsistence lifestyle based primarily on salmon (DCCED, 2009). The community was formally incorporated in 1970. As shown in Table 7, the community population has fluctuated slightly over the last two decades, growing from 253 residents in 1990 to 272 residents in 2008.

Table 7. Eek Population, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Eek	253	280	271	290	290	291	291	287	283	272

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009

3.1.1 Airport and Public Infrastructure

Although airports are a very important component of the Yukon-Kuskokwim Delta transportation infrastructure, according to a local air carrier, the region's airports are in poor shape (Dudley, R. 2009). Prior to extension, the Eek airport was a 1,400 x 35 foot runway (ADOT&PF, 2002). In 2002, the Alaska Department of Transportation and Public Facilities (ADOT&PF) completed a $2.1 million runway relocation and extension, creating a 3,243 x 60 foot gravel service runway, with medium intensity runway lights (AirNav, 2009).

The City and Village of Eek formed a joint Utility Commission, and a Utility Master Plan is underway (DCCED, 2009). A few homes have tanks that provide running water to the kitchen; but there is no additional plumbing. Eek residents are provided heat and electricity through the Alaska Village Electric Cooperative (AVEC). In 2007, 100 homes and 10 community buildings received services in Eek.

Fuel for this region of Alaska is transported from Anchorage on large barges and unloaded at the Bethel fuel depot on the Kuskokwim River, where it is then loaded onto smaller barges and brought to smaller coastal and riverine communities, including Eek (ISER, 2008). Bulk fuel storage is available through the Iqfijouaq Company Store (79,400 gallons); AVEC (67,300 gallons); Lower Kuskokwim Schools (45,500 gallons); the city (8,200 gallons); and the Army National Guard (4,300 gallons) (DCCED, 2009).

According to the latest Power Cost Equalization (PCE) report, total fuel consumption by the City of Eek during fiscal year 2007 for electricity generation was 56,570 gallons.

3.1.2 Local Economy

Eek's economy consists primarily of subsistence and commercial fishing activities. A few full-time positions exist with the school, city, and village office (DCCED 2009). In 2000, 65 percent of people 16 years and older were not in the labor force (i.e.,

unemployed and not seeking work), while almost 18 percent of the workforce was unemployed (U.S. Census, 2009).[5]

According to the 2000 U.S. Census, the per capita income in Eek was $8,957 and median family income was $27,500 (U.S. Census, 2009).

Commercial fishing is a primary source of economic activity for many residents. Eek is one of 20 communities that comprise the Coastal Villages Regional Fund, a regional organization focused on sustainable development and growth of commercial fishing (Coastal Villages Regional Fund, 2009).

The number of permits held and fished, as well as the total amount of fish caught has declined from 1990s levels. In 1990, there were 52 commercial fishing permits held and 47 of these permits were fished; in 2008, there were 45 permits held and 36 permits fished. The total catch in 1990 was 825,539 pounds for estimated revenue of $643,177.

As shown in Table 8, commercial fishing levels have been much lower during the 2000s. Eek permit holders' catch fluctuated between a low of 147,496 pounds landed in 2002 generating $39,972 in revenue, to a high of 514,098 pounds landed and $246,214 revenue generated in 2008. The yearly variation is caused by changes in annual salmon run size (i.e., the number of fish available to catch) and by permit holders' actual participation in the fishery. Permit holder participation can be driven by the presence or absence of a fish processor and by yearly variations in ex-vessel price. By far, the majority of fishing activity by Eek permit holders has been salmon fishing. There are no fish processing plants in Eek; instead, commercial fishers take their catch to processors in other communities, where the fish is processed and shipped out.

[5] It is important to note that individuals who are not in the labor force may still be actively supporting their families through subsistence activities or as unpaid caregivers (i.e., child and elder care).

Table 8. Eek Commercial Fishing Activity, 2000 – 2008

	Halibut		Herring		Salmon		Grand Total	
	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue
2000	0	0	2,023	$174	393,234	$180,409	395,256	$180,583
2001	254	$367	0	0	256,987	$88,962	257,242	$89,329
2002	0	0	0	0	147,496	$39,972	147,496	$39,972
2003	0	0	0	0	215,993	$61,075	215,993	$61,075
2004	0	0	0	0	388,636	$125,005	388,636	$125,005
2005	0	0	0	0	297,792	$127,330	297,792	$127,330
2006	0	0	0	0	413,234	$184,374	413,234	$184,374
2007	0	0	0	0	449,857	$220,670	449,857	$220,670
2008	0	0	0	0	514,098	$246,214	514,098	$246,214

Source: Developed by Northern Economics using proprietary algorithms with data from Annual Alaska Commercial Fisheries Entry Commission (CFEC) Reports, 2009.

Note: revenue estimated in nominal values

3.1.3 Air Carrier Activities

Eek passenger arrivals and departures are summarized in Table 9 and Figure 10. Since the 2002 runway extension, passenger arrivals and departures in Eek have increased by just over 45 percent, but the number of carriers providing service has fallen. The primary Eek passenger carriers are Grant Aviation, Hageland Aviation Services, and Yute Air. In the last six years Yute Air has grown into the dominant passenger carrier to Eek.

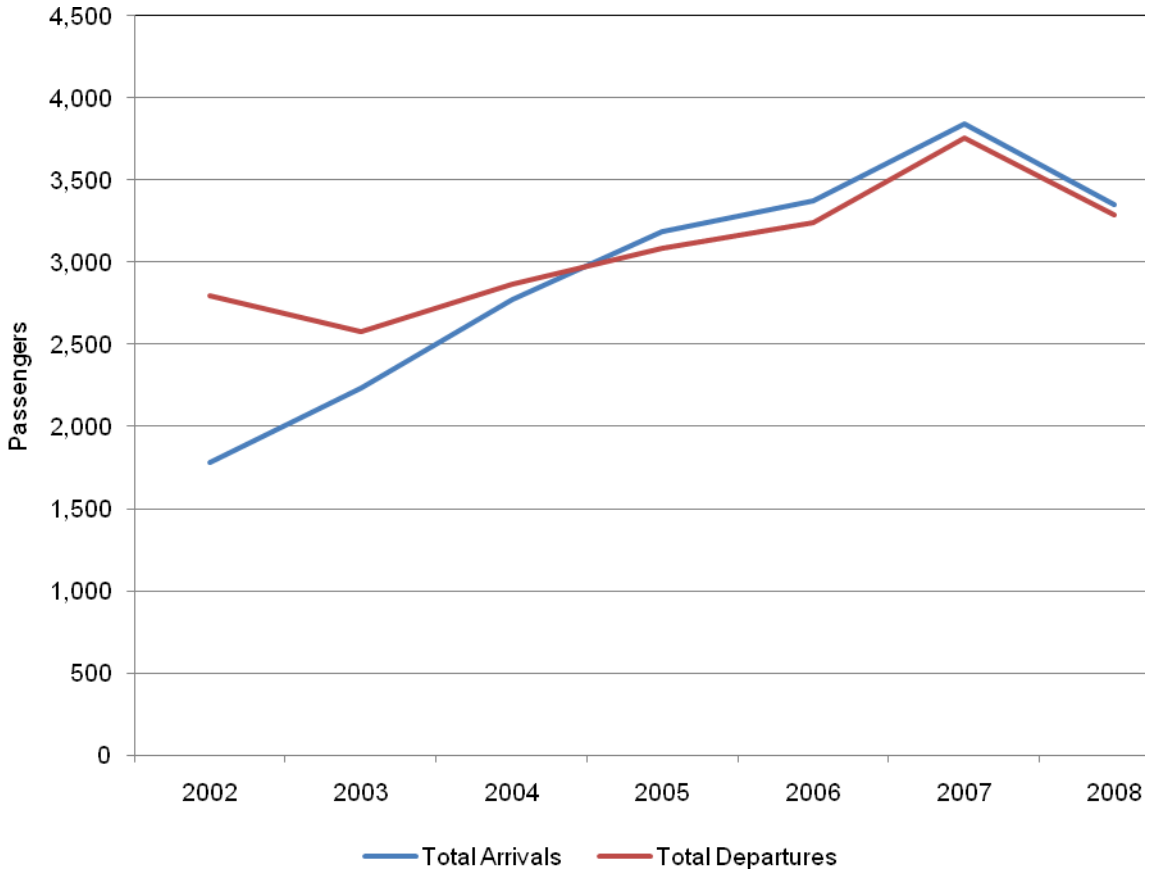
Table 9. Eek Passenger Arrivals and Departures, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Arrivals							
Arctic Circle Air Service	39	16	23	34	12	55	0
Era Aviation	414	296	142	113	7	0	0
Grant Aviation	1,122	1,364	909	705	768	993	864
Hageland Aviation Service	126	312	359	326	231	418	335
Inland Aviation Services	67	193	111	51	42	11	0
Larry's Flying Service	11	31	0	0	0	0	0
Peninsula Airways Inc.	2	5	2	0	0	1	0
Yute Air	0	21	1,228	1,962	2,317	2,363	2,153
Total Arrivals	1,781	2,238	2,774	3,191	3,378	3,841	3,352
Departures							
Arctic Circle Air Service	31	15	28	24	11	42	0
Era Aviation	1,374	598	179	116	13	0	0
Grant Aviation	1,133	1,327	963	713	700	997	898
Hageland Aviation Service	163	417	434	296	241	378	293
Inland Aviation Services	66	166	119	63	20	3	0
Larry's Flying Service	28	47	0	0	0	0	0
Peninsula Airways Inc.	3	1	2	0	0	1	0
Yute Air	0	8	1,145	1,871	2,256	2,338	2,101
Total Departures	2,798	2,579	2,870	3,083	3,241	3,759	3,292

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Figure 10. Eek Passenger Total Arrivals and Departures, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

The number of passengers per flight for flights transporting passengers to and from Eek is shown in Table 10. The number of passengers per flight arriving in Eek increased slightly from 1.2 to 2.1 passengers per arrival, and the number of passengers per departing aircraft increased from 1.8 to 2.1. There were 2,074 aircraft arrivals that included passengers in 2002 (i.e., aircraft carrying passengers along with other items such as luggage, freight, and/or mail), and 2,924 arrivals of passenger aircraft in 2008.

Table 10. Eek Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	2002	2008
Arctic Circle Air Service	0.3	0.0
Era Aviation	1.6	0.0
Grant Aviation	2.5	2.3
Hageland Aviation	0.9	1.5
Inland Aviation Services	1.1	0.0
Larry's Flying Service	0.3	0.0
Yute Air	0.0	2.4
Average	1.2	2.1
Departures by Carrier	**2002**	**2008**
Arctic Circle Air Service	0.2	0.0
Era Aviation	5.3	0.0
Grant Aviation	2.3	2.2
Hageland Aviation	1.1	1.4
Inland Aviation Services	1.2	0.0
Larry's Flying Service	0.6	0.0
Peninsula Airways Inc.	3.0	0.0
Average	1.8	2.1

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Table 11 and Figure 11 show air cargo volumes received and shipped for the community of Eek between 2002 and 2008. The amount of air cargo received varies greatly from one year to the next; however, sent cargo is fairly more constant and at a significantly lower quantity.

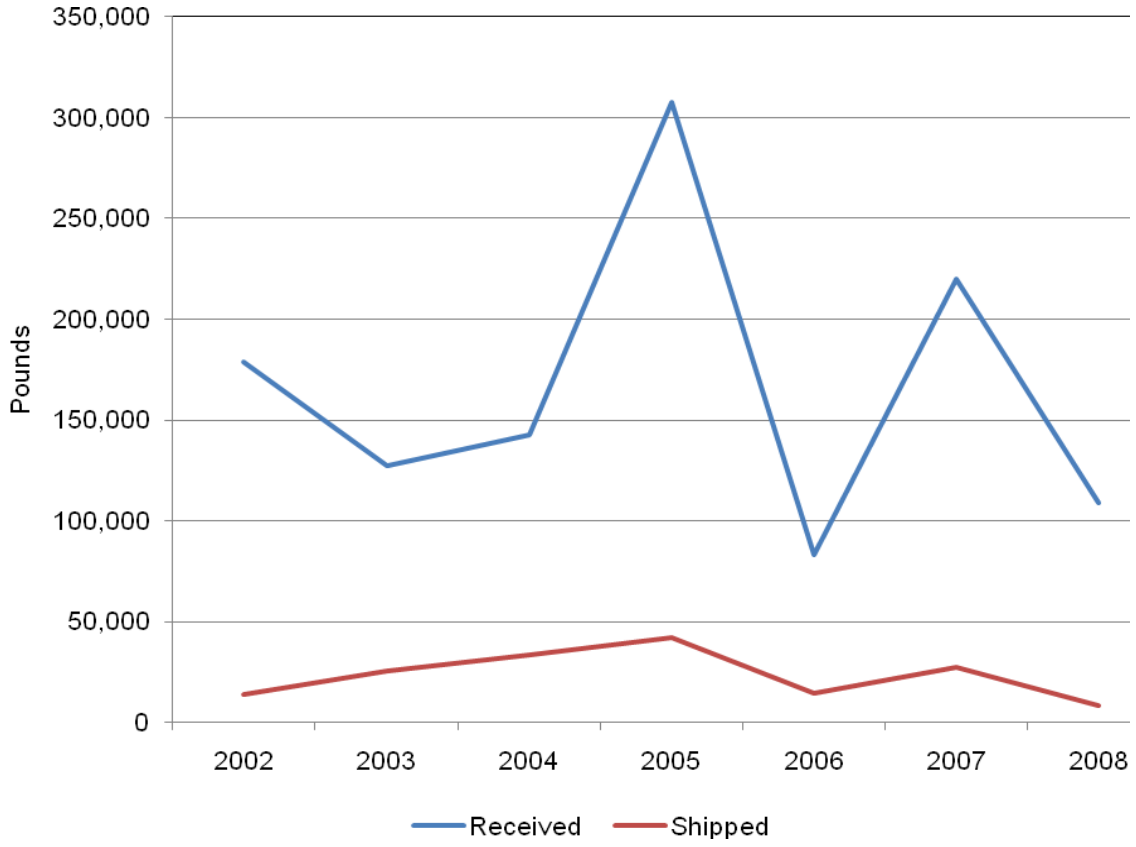
Table 11. Eek Air Cargo Received and Shipped, 2002 – 2008 (Pounds)

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Cargo Received							
Alaska Central Express	181	876	589	6,222	2,250	25,740	3,704
Arctic Circle Air Service	13,1694	44,087	79,867	172,119	31,036	32,158	2,091
Arctic Transportation	14,616	5,668	15,672	79,678	25,216	138,763	68,776
Bellair Inc.	6,975	1,337	0	0	0	0	0
Era Aviation	6,119	5,512	2,447	2,600	15	0	0
Frontier Flying Service	0	0	0	0	0	0	0
Grant Aviation	2,495	13,393	5,811	11,981	8,172	5,718	10,087
Hageland Aviation Service	8,371	34,486	10,051	26,570	9,145	5,781	6,644
Inland Aviation Services	10	8	1,566	0	2,174	0	0
Larry's Flying Service	0	0	0	0	0	0	0
Olson Air Service	0	58	0	0	0	0	0
Village Aviation	8,495	21,683	19,690	0	0	0	0
Yute Air	0	231	7,080	8,655	5,344	11,629	17,418
Grand Total	178,956	127,339	142,773	307,825	83,352	219,789	108,720
Cargo Shipped							
Alaska Central Express	0	0	0	0	0	0	20
Arctic Circle Air Service	12,235	15,305	28,802	10,085	3,254	4,715	0
Arctic Transportation	591	0	383	25,604	744	21,591	4,259
Bellair Inc.	0	0	0	0	0	0	0
Era Aviation	718	600	233	41	10	0	0
Frontier Flying Service	250	0	0	0	0	0	0
Grant Aviation	22	506	46	0	4	0	610
Hageland Aviation Service	10	8,390	2,982	5,830	9,600	0	537
Inland Aviation Services	0	11	467	0	0	0	0
Larry's Flying Service	0	0	0	0	0	0	0
Village Aviation	352	650	9	0	0	0	0
Yute Air	0	40	492	454	954	967	2,777
Grand Total	13,928	25,502	33,414	42,014	14,566	27,273	8,203

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Figure 11. Eek Cargo Received and Shipped, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

According to Mayor Carlie Beebe, cargo received in Eek increased significantly in 2005 and 2007 due to a community housing project (2009). Eek received an Indian Housing Block Grant in 2005 through the U.S. Department of Housing and Urban Development and another similar grant in 2007 (DCCED, 2009). Mayor Beebe mentioned that the longer runway allowed the use of larger aircraft that could hold larger pieces of building materials that would not have fit in a smaller aircraft. For the past two years, Arctic Transportation, an all-cargo air carrier that specializes in flying to remote communities in bush Alaska, has transported the majority of freight to Eek (Brown, M., 2009).

Table 12 and Figure 12 show mail received and sent from Eek between 2002 and 2008. The amount of mail received has fluctuated between 362,192 pounds in 2006 to 464,127 pounds in 2008. Similar to passenger service, the main air mail providers are Grant Aviation, Hageland Aviation Services, and Yute Air. Figure 12 illustrates the significant difference between total mail received and total mail sent. This difference can be explained largely by the fact that it is less expensive to buy goods in bulk in urban centers and use subsidized postal service to ship them than it is to buy goods at the local store.

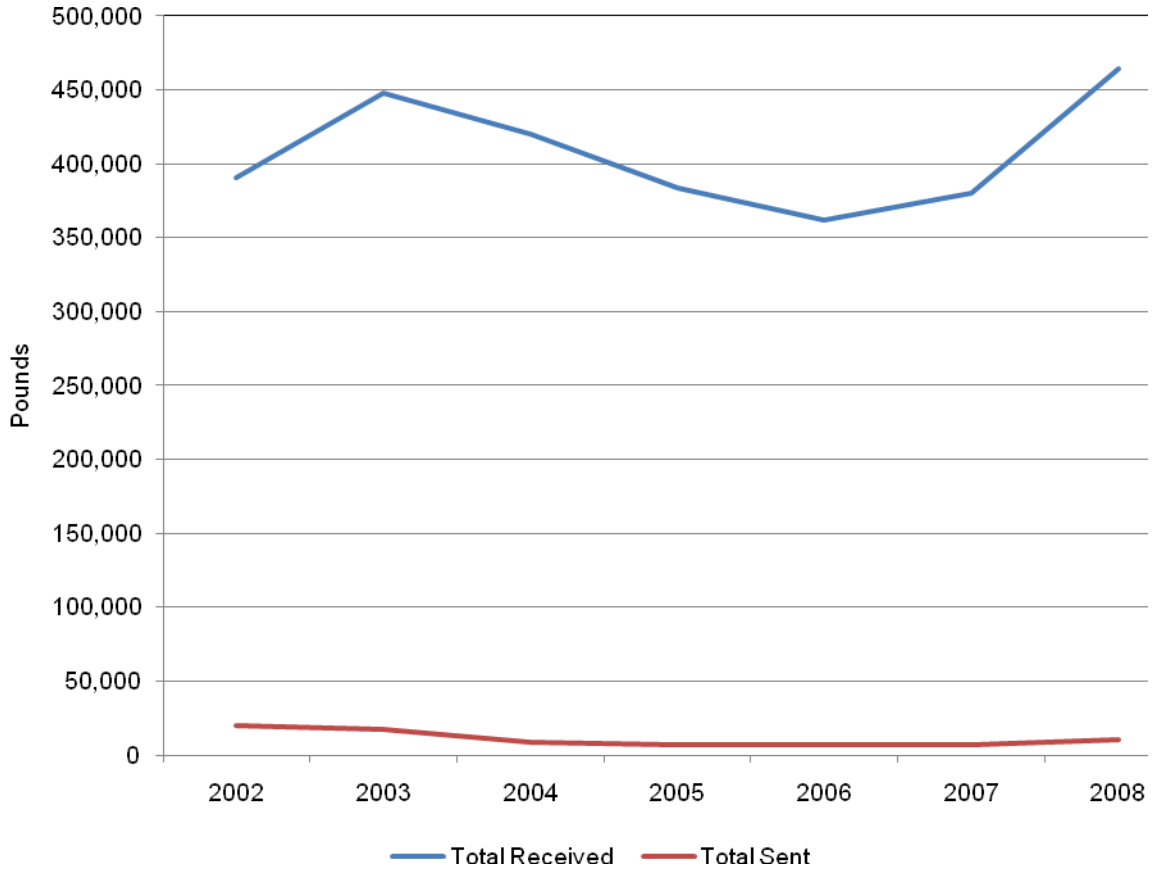
Table 12. Eek Air Mail Received and Sent, 2002 – 2008 (Pounds)

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Alaska Central Express	6,625	27,559	9,736	7,133	0	0	0
Arctic Circle Air Service	29,573	34,629	67,019	52,350	85,618	37,204	0
Arctic Transportation	41,554	44,779	21,736	24,417	118	47,345	104,705
Bellair Inc.	48,688	34,633	0	0	0	0	0
Era Aviation	49,528	39,762	24,235	1,217	0	0	0
Frontier Flying Service	29,781	24,602	0	0	0	0	0
Grant Aviation	40,019	66,178	220,861	128,601	116,435	127,853	149,413
Hageland Aviation Service	28,433	31,464	26,180	11,457	333	161	1,149
Inland Aviation Services	29,487	31,773	12,305	12,064	0	0	0
Larry's Flying Service	25,321	28,166	321	0	0	0	0
Olson Air Service	540	23,616	0	0	0	0	0
Village Aviation	31,811	31,869	8,487	0	0	0	0
Yute Air	29,349	28,904	29,446	146,618	159,688	167,259	208,860
Total Received	390,709	447,934	420,326	383,857	362,192	379,822	464,127
Air Mail Sent							
Alaska Central Express	0	1,163	0	0	0	0	0
Arctic Circle Air Service	853	754	205	265	24	0	
Arctic Transportation	2,178	2,078	694	198	1	2,081	2,063
Bellair Inc.	0	344	0	0	0	0	0
Era Aviation	9,335	4,910	1,011	197	0	0	0
Frontier Flying Service	118	385	0	0	0	0	0
Grant Aviation	4,300	2,859	2,104	434	349	46	1,073
Hageland Aviation Service	339	2,464	1,347	1,194	240	235	0
Inland Aviation Services	704	468	209	35	0	0	0
Larry's Flying Service	674	236	0	0	0	0	0
Olson Air Service	30	104	0	0	0	0	0
Village Aviation	348	816	5	0	0	0	0
Yute Air	1,434	629	2,791	4,541	6,422	4,369	6,990
Total Sent	20,313	17,210	8,366	6,864	7,036	6,731	10,126

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Figure 12. Eek Total Air Mail Received and Sent, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Table 13 shows the number and types of aircraft operated by air carriers serving Eek in 2008. These data represent the fleet mix of the air carriers, thus not all of the aircraft shown in Table 13 are used for Eek air service, since some of the aircraft require a runway longer than Eek's 3,243 x 60 foot runway (runway requirements are shown in Table 15). Single engine and small twin engine aircraft are most commonly utilized in Eek. Yute Air, Grant Aviation, and Arctic Transportation, three companies that primarily own and operate single-engine and small twin-engine aircraft, provided the majority of air service to and from Eek based upon passenger, cargo, and mail volumes described above.

Table 13. Air Carriers and Fleet Serving Eek in 2008

	Single Engine		Twin Engines						
Air Carrier Name	Cessna 208 Caravan	Cessna C206/ 207/209/ 210 Station-air	Piper Pa-31 (Navajo)/T-1020	Beech 1900 A/B/C/D	Beech 200 Super Kingair	Casa/ Nurtanio C212 Aviocar	Cessna C-402/ 402a and 406 Caravan	Shorts 330	Shorts Harland Sc-7 Skyvan
Alaska Central Express (1)	0	0	0	4	0	0	0	0	0
Arctic Circle Air Service (2)	0	0	0	0	0	0	5	2	2
Arctic Transportation (3)	0	4	0	0	0	4	0	0	0
Grant Aviation (4)	7	17	4	0	1	0	0	0	0
Hageland Aviation Service (5)	14	9	0	3	0	0	4	0	0
Yute Air (6)	0	12	0	0	0	0	0	0	0
Total	21	42	4	7	1	4	9	2	2

Source: (1) Hawthorne, G., Alaska Central Express, 2009. (2) Singsaas, D., Arctic Circle Air Service, 2009. (3) Arctic Transportation, 2009. (4) Richardson, W. Grant Aviation, 2009. (5) Hageland Aviation Service, 2009. (6) Dudley, E. Operations Director for Yute Air, 2009.

Note: Arctic Circle Air Service has 5 Cessna 402s, and Hageland Aviation Service has 4 Cessna 406 Caravans.

Eek arrivals by aircraft type are shown for 2002 and 2008 in Table 14. In 2002, there were 2,013 arrivals and in 2008 there were 2,919. The percent of total arrivals made by small, single-engine aircraft such as Cessna 206s and 207s increased from 62 percent of total landings in 2002 to 87 percent in 2008. Cessna 206s and 207s could land in Eek prior to the 2002 runway extension. Yute Air completed 1,693 of the landings by 206s and 207s in 2008, and Grant Aviation completed 541 landings. Yute Air specializes in serving remote Alaska communities and finds that it works well to operate a fleet of small aircraft that can provide regular air service to remote communities like Eek.

Between 2002 and 2008, there has been a switch away from the extremely small Cessna 172 Skyhawk aircraft to the larger and more efficient Casa 212 and Piper Pa-31 Navajo flights. As shown in Table 15, the Casa 212 requires a 2,950 foot runway for landing and the Piper Pa-31 Navajo requires a 2,000 foot runway.

Table 14. Eek Arrivals by Aircraft Type, 2002 and 2008

	2002		2008	
Aircraft Name	**Value**	**Percent**	**Value**	**Percent**
Beech 1900 A/B/C/D	0	0.0	2	0.1
Beech 200 Super Kingair	0	0.0	4	0.1
Casa/Nurtanio C212 Aviocar	0	0.0	57	2.0
Cessna 172 Skyhawk	232	11.5	0	0.0
Cessna 208 Caravan	120	6.0	169	5.8
Cessna 406 Caravan Ii	0	0.0	8	0.3
Cessna C206/207/209/210 Stationair	1,252	62.2	2,548	87.3
Dehavilland Twin Otter Dhc-6	296	14.7	0	0.0
Helio H-250/295/395	1	0.0	0	0.0
Piper Pa-31 (Navajo)/T-1020	4	0.2	129	4.4
Piper Pa-32 (Cherokee 6)	50	2.5	0	0.0
Shorts Harland Sc-7 Skyvan	57	2.8	2	0.1
Volpar Turbo 18	1	0.0	0	0.0
Grand Total	2,013	100.0	2,919	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

Table 15 shows direct operating costs per hour, maximum takeoff weight, maximum payload capacity, potential passenger seats, and minimum runway length for aircraft serving the community of Eek in 2008. Direct operating costs were estimated based on information reported by air carriers to the Bureau of Transportation Statistics (BTS). Direct and indirect air carrier costs are reported, with direct costs pertaining to specific airplanes and indirect costs relating to general air carrier operations. Direct costs include aircraft fuel, flight crew salaries, insurance, maintenance, and aircraft depreciation. They are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft. Maximum takeoff weight is the total allowable weight for the aircraft including cargo and passengers. Maximum payload is the difference between the empty weight and maximum takeoff weight of the aircraft. Added weight (or payload) to the aircraft includes passengers, cargo, and fuel.

Table 15. Overview of Aircraft Operating Costs, Payload, and Runway Requirements

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum payload (Pounds)[1]	Possible passenger seats[2]	Minimum runway length (Feet)[3]
Beech 1900 A/B/C/D	$1,127	17,120	5,775	19	3,900
Beech 200 Super Kingair	$2,816	12,500	4,398	13	4,450
Casa/Nurtanio C212 Aviocar	$1,192	16,975	5,000	19	2,950
Cessna 172 Skyhawk	NA	2,300	900	4	NA
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna 406 Caravan II	$1,244	9,850	2,768	14	4,050
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Helio H-250/295/395	$3,712	3,400	1,320	4 to 6	NA
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	2,000
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	NA
Shorts Harland Sc-7 Skyvan	$9,986	12,500	5,156	19	3,450

Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] The carrying capacity of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo. For example the Beech 1900C has a passenger version carrying up to 19 passengers and a cargo version with a payload of up to 5,775 pounds.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate for shorter landing or takeoff distance.

Although Eek's runway length is shorter than the minimum runway length listed for airplanes like the Beech 1900 or Beech 200 Super Kingair, a few of these airplanes did land in Eek in 2008 (as shown in Table 14). In order for larger aircraft to safely land on a shorter runway, air carriers will reduce the aircraft payload by 20 to 50 percent.

3.1.4 Community Impacts from Runway Extension

According to Mayor Carlie Beebe, the relocation and runway extension has been a major improvement for the community (2009). The runway extension project, along with the installation of runway lights and surface condition improvement, has been a major upgrade for ensuring Eek residents will be able to receive emergency medical treatment when needed, since the closest inpatient medical facility is located 34 air miles away in Bethel, Alaska (FAA, 2001). Local carriers, like Hageland Aviation, stated that the most significant benefit from the lengthened runway is improved reliability of service and safety (Thurston, P., 2009).

Although passenger arrivals and departures have increased by almost half over the past six years since the runway extension (see Table 9), fares charged for passenger service have not decreased due to the runway extension. In general air carriers are only able to reduce passenger fares when the volume of passengers increases enough to allow the use of a lower cost aircraft (on a per passenger cost basis). Small air carriers that specialize in serving remote locations account for almost 65 percent of air passenger service to and from Eek. A typical example of such a carrier is Yute Air, which flies only Cessna 206s with a total fleet of 12. Cessna 206s can carry up to five passengers depending upon baggage, equipment, and destination. As mentioned previously, Cessna 206s could fly to Eek before the 2002 runway extension. According to Yute Air, they have no plans to add larger aircraft to their fleet because the Cessna 206 works well for the market they serve—a small number of passengers (at one time) flying to remote Alaska communities and wilderness destinations (Dudley, R., 2009). Hageland Aviation, an air carrier that has both small and larger aircraft in their fleet (see Table 13), typically only fly their smaller Cessna 206 and 207 aircraft to Eek because they fit local demands for passenger and cargo service. According to Hageland Aviation Service, if they did fly a larger aircraft to Eek, they may have to increase passenger fares to cover the added costs of flying a larger aircraft (Thurston, P., 2009).

In terms of cargo shipments, the runway extension may allow the community to complete capital improvement projects at a slightly lower cost if the community is able to negotiate cargo rates for large shipments. For example, Arctic Transportation indicated

that the price of shipping cargo would decrease (on a per-pound basis) if the full payload of a large chartered aircraft was utilized for cargo shipments (Brown, M., 2009). In contrast, Hageland Aviation Services does not negotiate on their shipping prices, and indicated that their cargo price would typically be around $0.50 per pound for cargo shipments to Eek regardless of the aircraft used.

In recent years, Arctic Transportation has provided the majority of air cargo service to Eek—in 2008 carrying 63 percent of the 108,720 pounds of cargo received in Eek and 52 percent of the 8,203 pounds shipped from Eek (see Table 11). According to Arctic Transportation's flight operations director, the runway extension has allowed them to use their larger aircraft (CASA 212—an aircraft with a 5,000 pound payload), and bring in larger loads on one flight (Brown, M., 2009). Prior to the extension, Arctic Transportation could only use their Cessna 207 in Eek, and had to restrict their payload to 1,000 pounds.

Table 16 shows a comparison of flying freight with a Cessna 207 and a CASA 212, shipping 5,000 and 100,000 pounds, and making a round-trip between the regional hub of Bethel and Eek. The comparison is based on April 2009 charter costs provided by Arctic Transportation.

Table 16. Changes in Shipment Costs

	Payload (Pounds)	Hourly operating cost	Per pound shipping cost	Delivery cost estimate (based on one hour of travel)	
				5,000 pounds	100,000 pounds
Cessna 207	1,000	$525	$.52	$3,900	$78,000
CASA 212	5,000	$2,100	$.42	$2,100	$42,000
			Difference	$1,800	$36,000

Source: Northern Economics, Inc. calculations based upon communications with Arctic Transportation (Brown, M., 2009).

Note: Payload amount per plane is based on estimates provided by Arctic Transportation. Also, the Cessna 207 flies at 110 knots per hour, so it is assumed to take 1.5 hours round-trip. The CASA 212, which travels at 160 knots, is assumed to take 1 hour round-trip.

There is currently not an active processor in Eek, because it is not a profitable location from which to process fish. There are several other salmon processors around the state

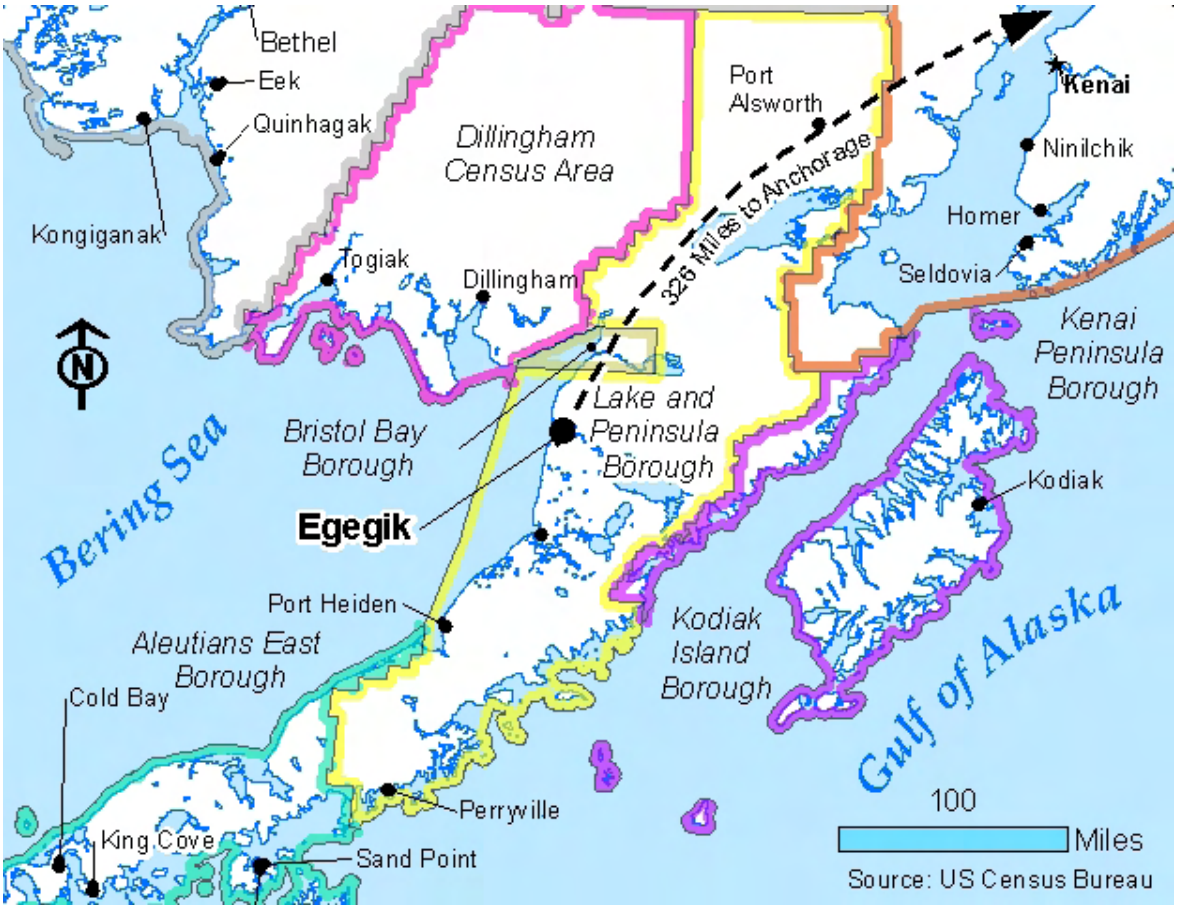
that can process fish and transport it to market less expensively because of their closer location to Anchorage or west coast markets. Although there may be cost-savings associated with transporting goods to and from Eek, in general the longer runway is not expected to create new economic activity, such as the development of a new fish processing plant (Guffey, G. 2009).

All fuel delivery to Eek is via barge and no air deliveries of fuel have been made in recent years, so the longer runway is not expected to have an impact on fuel transportation costs.

3.2 Egegik

The community of Egegik is located on the south bank of the Egegik River on the Alaska Peninsula. It is part of the Lake and Peninsula Borough and is about 326 air miles southwest of Anchorage, 100 miles southwest of Dillingham, and 35 miles southwest of King Salmon. Figure 13 illustrates Egegik's location in relation to nearby communities and Anchorage.

Figure 13. Geographic Location of Egegik



Source: Alaska Map Company, 2009.

Egegik has 62 fulltime residents, and experiences a large increase in population during the commercial fishing season. Egegik's population has been declining over the last two decades, falling from 122 residents in 1990 to 116 in 2000, and 62 in 2008, declining by an average annual rate of 3.6 percent (Table 17). However, during the commercial fishing season the population of Egegik can swell to more

than seven times its normal size, gaining 1,000 to 2,000 seasonal cannery workers and fishers annually (Sepez, et al, 2005).

Table 17. Egegik Population, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Egegik	122	116	80	87	83	77	81	76	62	62

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

According to the 2000 U.S. Census, out of the 116 inhabitants of Egegik, about 48 percent of the population was between the ages of 25 and 54 years (U.S. Census, Bureau, 2009). Over 75 percent of the village population is Alaska Native and the remaining population is white (Sepez, et al, 2005).

One hundred percent of the population lived in households rather than group quarters. There were a total of 286 housing units in Egegik, although only 44 were occupied, with 242 households vacant due to seasonal use during the summer commercial fishing season (Sepez, et al, 2005).

3.2.1 Airport and Public Infrastructure

In 2001, the Egegik Airport runway was relocated and extended. The total project cost $4,517,333, and the FAA provided a grant of $4,235,000 (DCCED, 2009). The extended runway dimensions are 5,600 x 100 feet. The runway is gravel with medium intensity runway lights (AirNav, 2009). The Egegik Village Council strongly supported the runway extension because of the commercial fishing activities of the village and concerns over airport safety (Good, L., 2009).

Egegik is accessible by air, water, and also snow machine in the winter. Barges typically bring goods and fuel to Egegik a few times a year. Although Egegik normally receives fuel by barge, Egegik had to fly fuel in when there was not enough to last the entire winter of 2008 (Strand, D., 2009).

Egegik Light & Power is the electric utility for the community. It is a private operator that provides heat and electricity through a 526 kW diesel generator. Electrical

generation consumed 65,775 gallons of fuel in 2007 (Alaska Energy Authority, 2008).

Egegik fuel tank owners include Egegik Fuel Co. (44,400 gallons.), Lake & Peninsula Schools (2,000 gallons), Woodbine Alaska Fish Co. (98,000 gallons), City (68,000 gallons), Nelbro Packing Co. (52,000 gallons), Egegik Trading Co. (2,000 gallons), and Dick Deigh (14,400 gallons) (DCCED, 2009). Total fuel storage capacity is 228,800 gallons.

3.2.2 Local Economy

The Egegik economy is based on subsistence harvest, commercial fishing, and fish processing (DCCED, 2009). Subsistence hunting and fishing activities are an important part of residents' lifestyle and local diet. Seal, beluga, salmon, trout, smelt, grayling, clams, moose, bear, caribou, porcupine, waterfowl, and ptarmigan are utilized. Local residents also gather berries and wild greens each season.

According to the 2000 Census, the potential work force (residents 16 years and older in 2000) was 80 people, 21 of whom were employed. The unemployment rate was 27.6 percent with eight people unemployed and actively seeking work, while 73.8 percent of the potential workforce was not in the labor force (i.e., they were unemployed and not seeking work) (U.S. Census Bureau, 2009). Per capita income in Egegik in 2000 was $16,352 and median household income was $46,000 (U.S. Census Bureau, 2009).

Salmon is the major commercial fishery for the Egegik area. There are a handful of onshore fish processors in Egegik. The largest is the Icicle Seafoods plant, a canning and freezing facility that was bought from Woodbine Alaska Fish Company in 2003 (Dennison, M., 2009). The company stated that it is difficult for them to compete in the fresh fish market from Egegik because there are other much less expensive locations from which to move fresh fish (like Homer, Kenai, and Seward where fish can be trucked directly to Anchorage for 8 cents to 12 cents per pound) (Calahan, M., 2009). On average it costs roughly $1 per pound to fly fresh fish out of

Egegik to Anchorage. Once in Anchorage, the fish is reconfigured and flown to wherever the demand may be (Dennison, M., 2009).

The Port of Egegik's salmon landings for years 2000 through 2007 are shown in Table 18. Landings include all fish delivered to Egegik for processing and not just fish caught by fishers from Egegik. There are fewer than 10 Egegik fishers harvesting fish.

Table 18. Port of Egegik Processed Salmon, 2000 – 2007

Year	Total pounds	Estimated gross earning
2000	5,298,880	$530,174
2001	7,911,550	$4,721,748
2002	11,375,007	$4,672,430
2003	23,218,722	$11,344,570
2004	14,274,413	$7,206,033
2005	61,394,217	$31,325,919
2006	49,684,523	$30,580,575
2007	43,374,102	$28,223,187
2008	39,770,424	$26,094,073

Source: Commercial Fishing Entry Commission, 2009.

The largest processors in Egegik ship their frozen fish out by barge, typically to Dutch Harbor, where the fish is consolidated and shipped to Asia (Japan, China, or South Korea), or to Seattle (Good, L., 2009). Alaska General Seafoods processes salmon in Egegik and transports the fish to Naknek where it is consolidated and shipped to their customers (Anderson, N., 2009). Based upon information provided by industry experts, it costs around $0.24 per pound to barge frozen fish to Seattle, and between $0.38 and $0.41 to ship frozen fish to Asia.

3.2.3 Air Carrier Activities

Passenger arrivals and departures for Egegik are shown in Table 19 and Figure 14. Both passenger arrivals and departures have decreased slightly in the past three years. Peninsula Airways is the main passenger carrier for Egegik, offering connecting service through their King Salmon hub. Peninsula Airways typically serves Egegik using a Cessna Caravan (208), which can carry up to nine

passengers and 200 pounds of cargo (Bloomquist, S., 2009). It also uses the Piper Pa-32, another small, single-engine aircraft that can carry up to six passengers (BTS, 2009). According to Peninsula Airways, since the 2001 runway extension, they have not increased the size of aircraft flown to Egegik because there has not been an increase in the number of passengers flying to and from the community (Bloomquist, S., 2009).

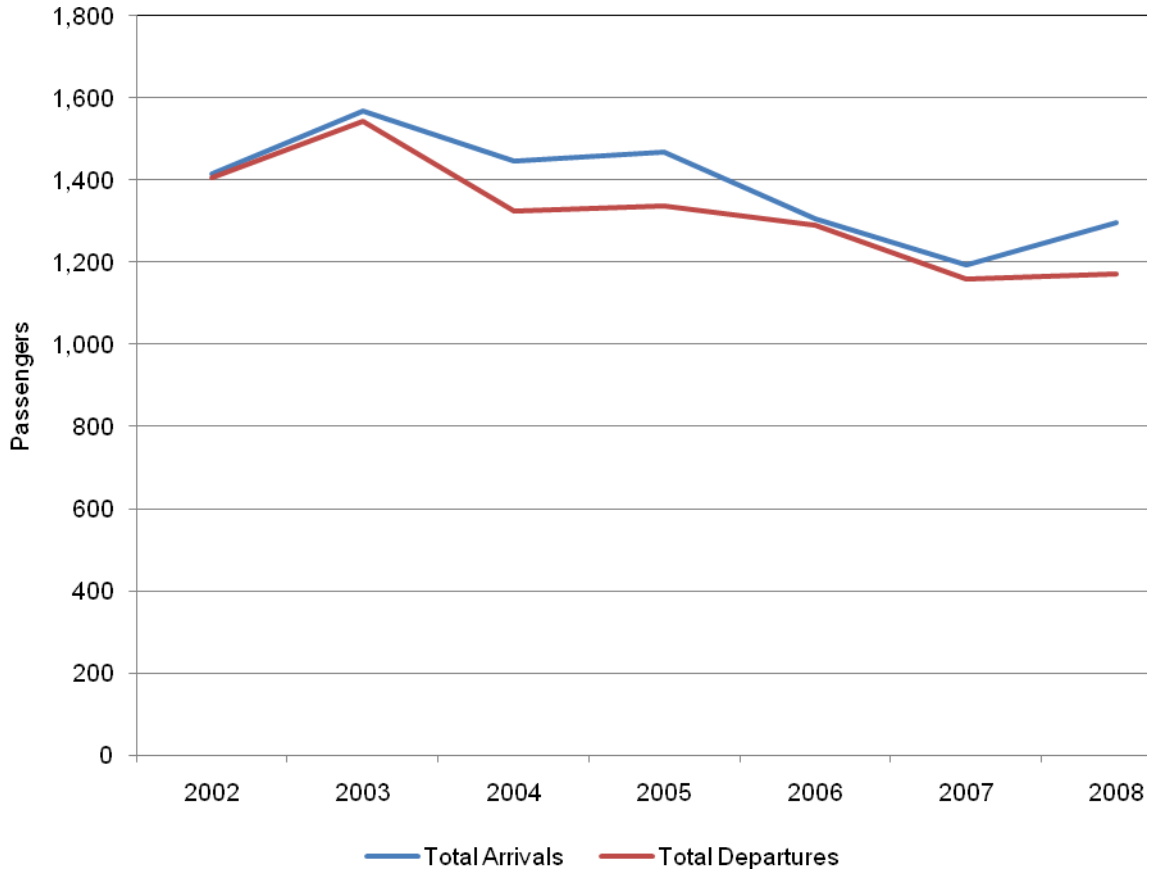
Table 19. Egegik Passenger Arrivals and Departures, 2001 – 2008

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Arrivals							
Arctic Circle Air Service	0	1	2	19	35	0	0
Grant Aviation	0	0	0	2	0	0	0
Hageland Aviation Service	9	4	67	8	0	0	2
Iliamna Air Taxi	5	17	7	19	0	0	14
Island Air Service	0	54	10	0	0	9	0
Peninsula Airways Inc.	1,401	1,494	1,362	1,409	1,265	1,185	1,282
Servant Air, Inc.	0	0	0	11	7	0	0
Total Arrivals	1,415	1,570	1,448	1,468	1,307	1,194	1,298
Departures							
Arctic Circle Air Service	0	0	3	27	32	0	0
Grant Aviation	2	0	0	2	0	0	0
Hageland Aviation Service	0	4	168	1	54	59	2
Iliamna Air Taxi	0	13	2	13	0	0	0
Island Air Service	7	36	4	0	8	0	0
Peninsula Airways Inc.	1,400	1,491	1,149	1,295	1,197	1,100	1,170
Servant Air, Inc.	0	0	0	0	0	0	0
Total Departures	1,407	1,544	1,326	1,338	1,291	1,159	1,172

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Figure 14. Egegik Total Passenger Arrivals and Departures, 2001 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: As indicated by Bureau of Transportation Statistics, data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Egegik per flight is shown in Table 20. From 2002 to 2008, the average number of passengers on arriving flights increased from 1.7 to 1.8 passengers per flight and the number of passengers on flights departing Egegik increased slightly from 1.5 to 1.7. The total number of arriving Egegik aircraft that carried passengers (along with other items such as freight and mail) was 932 in 2002 and 1,010 in 2008 (BTS, 2009).

Table 20. Egegik Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	2002	2008
Frontier Flying Service	0.0	7.0
Hageland Aviation Service	9.0	1.0
Iliamna Air Taxi	5.0	4.7
Island Air Service	3.5	0.0
Peninsula Airways Inc.	1.7	2.0
Average	1.7	1.8
Departures by Carrier	**2002**	**2008**
Grant Aviation	2.0	0.0
Hageland Aviation	0.0	1.0
Iliamna Air Taxi	0.0	0.0
Island Air Service	7.0	0.0
Northern Air Cargo Inc.	0.0	0.0
Peninsula Airways Inc.	1.5	1.9
Average	1.5	1.7

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Table 21 and Figure 15 show the cargo shipments received and sent from Egegik. Cargo received in Egegik has fluctuated between a low of 118,677 pounds in 2004 and a high of 216,119 pounds in 2008. Cargo shipped from Egegik has also fluctuated, likely depending on the amount of fresh fish flown out. Other than 2003 (see note below table), cargo shipments out of Egegik have been very small considering that total salmon processed in Egegik was over 43 million pounds in 2007 and over 39 million pounds in 2008, while the total amount of cargo shipped out of Egegik was 104,422 pounds in 2007 and 243,816 pounds in 2008. Over the past two years, Alaska Central Express has been the main air carrier transporting between 84,003 and 189,757 pounds out of Egegik annually.

Table 21. Egegik Air Cargo Received and Shipped, 2002 – 2008 (Pounds)

Air Carrier	2002	2003	2004	2005	2006	2007	2008
Cargo Received							
Alaska Central Express	0	0	0	0	5,400	32,407	50,181
Arctic Circle Air Service	0	0	4,750	31,217	72,228	7,272	12,972
Hageland Aviation Service	500	0	2,814	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	0	36,508
Northern Air Cargo Inc.	0	68,154	2,436	0	0	0	0
Peninsula Airways Inc.	14,600	88,138	108,667	80,829	52,716	85,765	70,008
Servant Air Inc.	0	0	0	1,210	400	0	0
Tatonduk Flying Service	130,025	0	0	26,722	0	0	46,450
Total Received	145,125	156,292	118,667	139,978	130,744	125,444	216,119
Cargo Shipped							
Alaska Central Express	0	0	0	0	108,449	84,003	189,757
Arctic Circle Air Service	0	0	10,400	2,891	7,515	3,875	0
Hageland Aviation Service	0	0	17	0	0	0	0
Northern Air Cargo Inc.	0	975,381[1]	0	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	0	0
Peninsula Airways Inc.	24,343	6,860	14,353	25,078	6,523	16,544	7,154
Tatonduk Flying Service[2]	0	20,726	0	28,423	0	0	46,905
Total Shipped	24,343	1,002,967	24,770	56,392	122,487	104,422	243,816

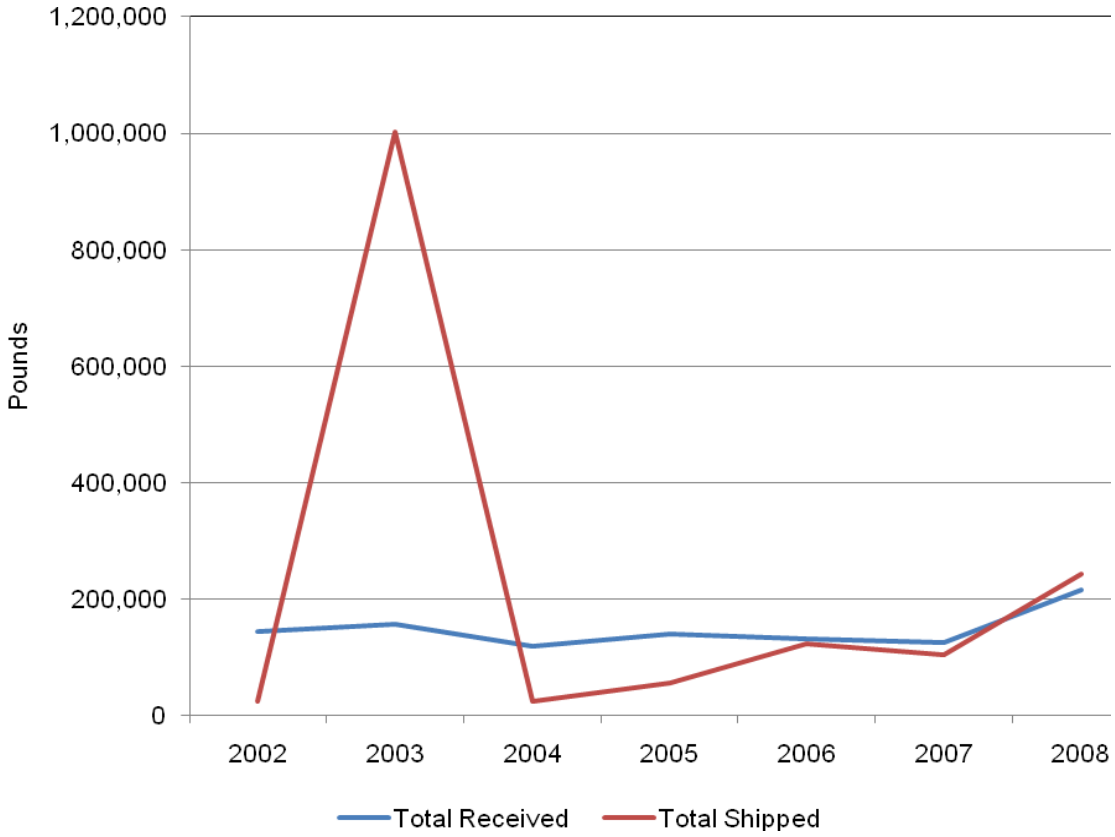
Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Notes:

[1] Northern Air Cargo is checking their records to verify this amount

[2] Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

Figure 15. Egegik Total Air Cargo Received and Sent, 2002 – 2008 (pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Data prior to 2002 for rural Alaska communities are unavailable and/or unreliable (Stankus, B., 2009).

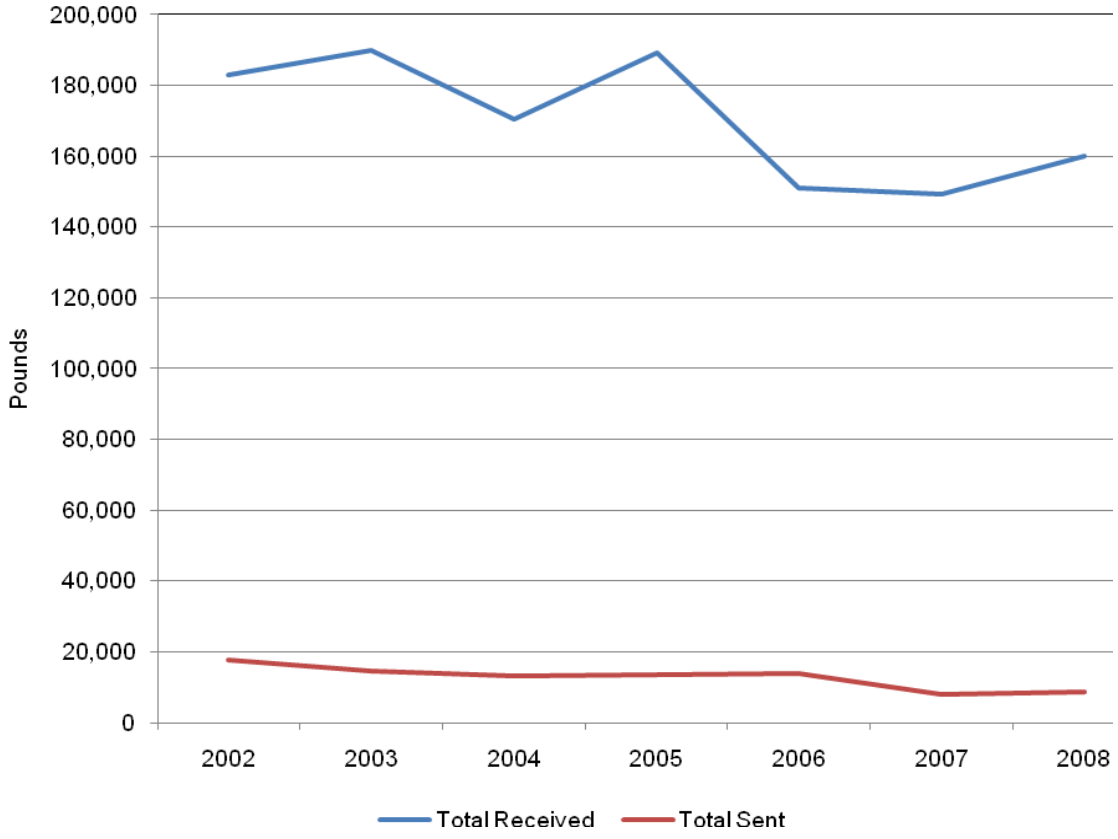
Received and shipped air mail for the community of Egegik is shown in Table 22 and Figure 16. The amount of mail received is declining at a rate similar to the population decline in Egegik (a decrease of approximately 3.6 percent annually), while the amount of air mail sent has decreased more rapidly.

Table 22. Egegik Air Mail Received and Sent, 2002 – 2008 (pounds)

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Arctic Circle Air Service	0	0	0	23,357	36,357	0	0
Peninsula Airways Inc.	182,816	189,819	170,609	166,119	114,817	149,287	160,152
Total Received	182,816	189,819	170,609	189,119	151,174	149,287	160,152
Air Mail Sent							
Peninsula Airways Inc.	17,673	14,625	13,203	13,573	13,954	7,832	8,713
Total Sent	17,673	14,625	13,203	13,573	13,954	7,832	8,713

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Figure 16. Egegik Total Air Mail Received and Sent, 2002 – 2008 (pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Air carriers serving Egegik in 2008 and their fleets are shown in Table 23. Alaska Central Express and Peninsula Airways provide the majority of passenger, cargo,

and air mail service to and from Egegik. Alaska Central Express's fleet is four Beech 1900 aircraft. Peninsula Airways has seven different types of aircraft in their fleet (Bloomquist, S., 2009 and BTS, 2009).

Table 23. Air Carriers and Fleet Serving Egegik in 2008

	Single Engines			Twin Engines								
Air Carrier Name	Cessna 208 Caravan	Cessna 206/207 /209/210 Stationair	Piper Pa-32 (Cherokee 6)	Beech 1900 A/B/C/D	Casa/ Nurtanio C212 Aviocar	Cessna 406 Caravan II and Cessna 402/402a	Piper Pa-31 (Navajo)/ T-1020	Shorts 330 and Shorts Harland Sc-7 Skyvan	Saab 340	C-46	McDonnell Douglass DC-6 and DC-6a	Other twin engines
Alaska Central Express (1)	0	0	0	4	0	0	0	0	0	0	0	0
Arctic Circle Air Service (2)	0	0	0	0	0	5	0	2	0	0	0	0
Arctic Transportation (3)	0	4	0	0	4	0	0	0	0	0	0	0
Grant Aviation (4)	7	17	0	0	0	0	4	0	0	0	0	1
Peninsula Airways Inc. (5)	5	0	7	0	0	0	1	0	10	0	0	3
Hageland Aviation Service (6)	4	4	0	4	0	4	0	0	0	0	0	0
Yute Air Aka Flight Alaska (7)	0	12	0	0	0	0	0	0	0	0	0	0
Everts Air Cargo (8)	0	0	0	0	0	0	0	0	0	2	8	0
Everts Fuel (8)	0	0	0	0	0	0	0	0	0	2	3	0
Total	16	37	7	8	4	8	4	6	10	4	11	4

Sources: (1) Hawthorne, G., Alaska Central Express, 2009. (2) Singsaas, D. Arctic Circle Air Service, 2009. (3) Arctic Transportation, 2009. (4) Richardson, W. Grant Aviation, 2009. (5) Bloomquist, S. Peninsula Airways, 2009. (6) Hageland Aviation Service, 2009. (7) Dudley, E. Operations Director for Yute Air, 2009. (8) Adams., D. Everts Air Service, 2009.

Note: Arctic Circle Air Service has five Cessna 402s, Hageland Aviation Service has four Cessna 406 Caravans, and in the category "Other twin engines" Peninsula Airways has two G-21 Grumman Gooses and one T-1040 Turbo, and Grant Aviation has one Beech 200 Super Kingair.

Egegik airport arrivals by aircraft type in 2002 and 2008 are shown in Table 24. By far, the majority of airport arrivals in 2002 and 2008 were Piper Pa-32s (80 percent and 73 percent, respectively). Although the minimum runway length for a Piper

Pa-32 is unavailable, these aircraft are small, single engine planes that are similar in size to a Cessna 206 and 207; thus, their minimum runway requirement is likely between 1,500 and 2,000 feet. The Cessna 208 was the second most common type of aircraft used in Egegik, accounting for 14 percent of arrivals in 2002 and 16 percent in 2008. As shown in Table 25, the Cessna 208 Caravan requires a 2,500 foot runway. The third most common aircraft used for flights to Egegik is the Beech 1900, an air craft used by Alaska Central Express to provide air cargo service.

Table 24. Egegik Arrivals by Aircraft Type, 2002 and 2008

	2002		2008	
Aircraft Name	**Number**	**Percent**	**Number**	**Percent**
Beech 1900 A/B/C/D	0	0.0	67	6.6
Beech 65/65a-80/65b-80 (Queen Air)	2	0.2	0	0.0
Beech Bonanza 35a/C/D/E/G/H/J/K/S/V/ 36a	0	0.0	1	0.1
Cessna 208 Caravan	142	14.2	161	16.0
Cessna C206/207/209/210 Stationair	8	0.8	2	0.2
Lockheed L100 Hercules	0	0.0	1	0.1
McDonnell Douglas DC-6	1	0.1	3	0.3
Pilatus Pc-12	0	0.0	1	0.1
Piper Pa-31 (Navajo)/T-1020	45	4.5	32	3.2
Piper Pa-32 (Cherokee 6)	802	80.2	737	73.0
Piper T-1040	0	0.0	1	0.1
Shorts 330	0	0.0	3	0.3
Total	1,000	100.0	1,009	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

Table 25 shows direct operating costs per hour, maximum takeoff weight, maximum payload capacity, potential passenger seats, and minimum runway length for aircraft serving the community of Egegik in 2008. Direct operating costs were estimated based on information reported by air carriers to the Bureau of Transportation Statistics (BTS). Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft. Direct costs include aircraft fuel, flight crew salaries, insurance, maintenance, and

aircraft depreciation. Maximum takeoff weight is the total allowable weight for the aircraft including cargo and passengers. Maximum payload is the difference between the empty weight and the maximum takeoff weight of the aircraft. Added weight (or payload) includes passengers, cargo, and fuel.

Table 25. Overview of Direct Aircraft Operating Costs, Payload, and Runway Requirements

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum Payload (Pounds) [1]	Possible passenger seats[2]	Minimum runway length (Feet)[3]
Beech 1900 A/B/C/D	$1,127	17,120	5,775	1,192	3,900
Beech Bonanza 35a/C/D/E/G/H/J/K/S/V/ 36a	$393	3,125	1,125	4 to 6	NA
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Lockheed L100 Hercules	NA	155,000	52,204	1[4]	4,850
McDonnell Douglas DC-6 and DC-6a	$3,000	97,200	30,000	48 to 56[5]	4,000
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	2,000
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	NA

Sources: : AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] The carrying capacity available for cargo and/or passengers of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight. Also, different versions of the same aircraft specialize in passenger seating or cargo—the Beechcraft 1900C can be configured for passenger seating of 19 or for cargo shipping with a maximum payload of 5,775 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate.

[4] Lockheed L100 Hercules aircraft are used primarily for large cargo shipments.

[5] Most DC-6 aircraft are usually equipped to carry freight so they will not have passenger seating.

3.2.4 Community Impacts from Runway Extension

Similar to other runway extensions, the 2001 Egegik extension improved air safety and access to the community. Egegik is 72 air miles from the closest inpatient medical facility located in Dillingham, Alaska (FAA, 2001). Reliable air service is critical for providing emergency medical care.

Increased economic activity related to the runway extension has been minimal. As described in section 3.2.2, the Egegik economy is based on commercial fishing, fish processing and subsistence harvesting (DCCED, 2009). Local commercial fish processors ship out almost all of their fish by barge. As shown in Table 18, in 2008 Egegik processed over 39 million pounds of salmon, and only 244,000 pounds of cargo was flown out of the community. This outbound cargo can be assumed to be primarily fish given that commercial fishing is the main economic activity for Egegik. According to Icicle Seafoods, the largest local processor, Egegik's challenge is that it is still too expensive to fly fish out compared to the cost of barging fish. There is no west-bound freight to offset some of the costs of flying fish to Anchorage (Woodruff, J., 2009). As a result, Icicle Seafoods freezes their fish after processing and transports it out by barge.

As shown in Table 19, passenger volumes to and from Egegik have not grown since the 2001 runway extension, and they have even declined slightly in the past three years. Peninsula Airways, the main passenger carrier for the community, has continued to operate the same aircraft as it did prior to the runway extension because there has been no significant change in passenger volumes (Bloomquist, S., 2009). Likewise, the runway extension has not affected fares charged for passenger service to and from Egegik.

Unlike most years, when Egegik receives all its fuel through barge service, fuel was flown into the community in 2008. Everts Fuel came in twice in late winter, prior to when the barge could make it safely in the spring (Strand, D., 2009).[6] As noted previously, Everts Fuel uses a DC-6 that can carry 5,000 gallons of fuel and requires

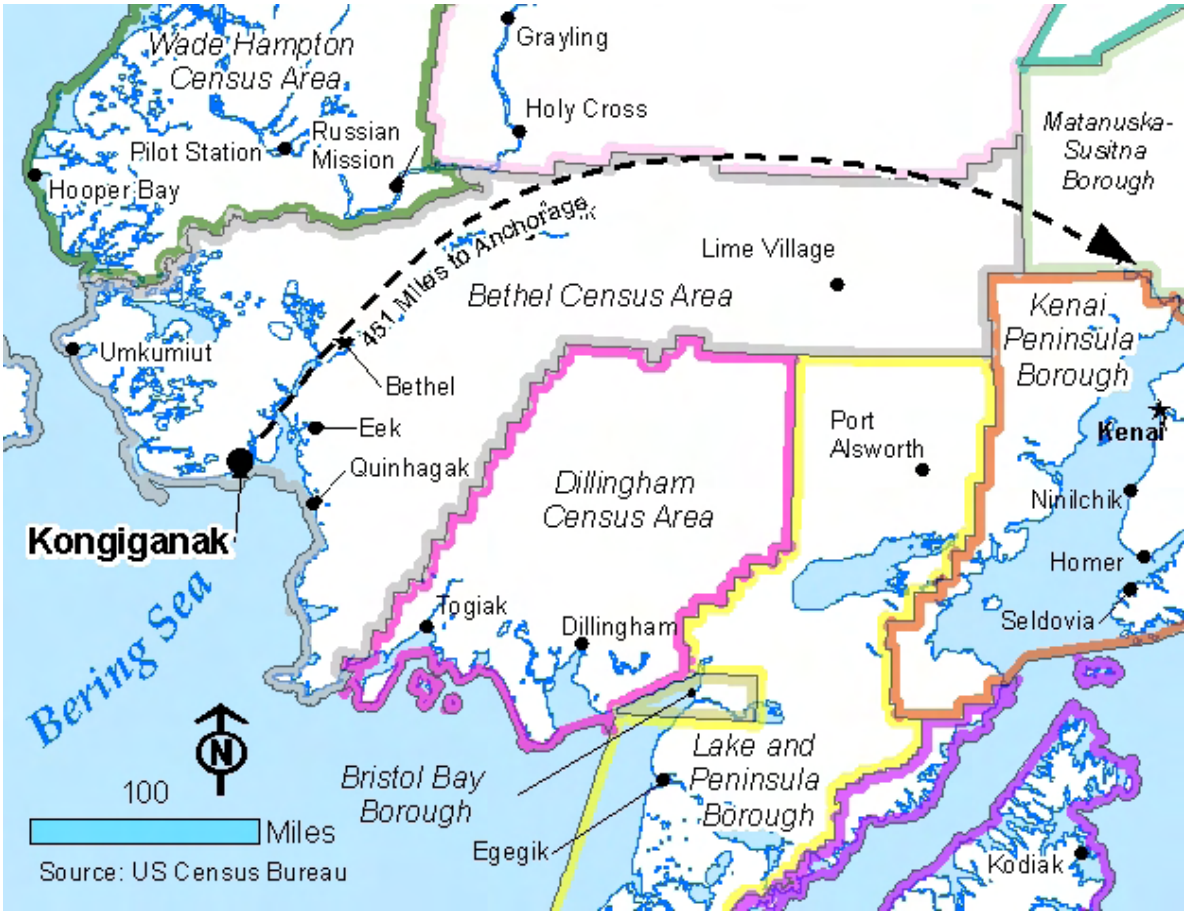
[6] The exact amount of fuel delivered by Everts is unknown.

approximately a 4,000 foot runway, and a C-46 aircraft that can carry approximately 2,000 gallons of fuel per trip. The cost difference between these planes for transporting fuel between the nearest Everts hub (Kenai) and Egegik is roughly $1.10 per gallon based on the current transportation cost estimate for each type of plane operated by Everts (Adams, D., 2009). This difference is just over 20 percent of the current cost of flying in fuel with a C-46. It is impractical to estimate an annual savings from these data as fuel is only flown into Egegik on an emergency basis.

3.3 Kongiganak

Kongiganak is located on the west shore of Kuskokwim Bay on the Bering Sea, 70 miles southwest of Bethel and 451 miles west of Anchorage (DCCED, 2009). Kongiganak has been historically occupied by Yup'ik Eskimos. The village was permanently settled in the late 1960s by former residents of Kwigillingok, who were seeking higher ground to escape periodic flooding (DCCED, 2009). Kongiganak's location is shown in Figure 17.

Figure 17. Geographic Location of Kongiganak



Source: Alaska Map Company, 2009.

Kongiganak's population grew from 294 residents in 1990 to 445 residents in 2008, experiencing a 2.4 percent rate of growth annually (Table 26).

Table 26. Kongiganak Population 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Kongiganak	294	359	372	372	403	412	425	415	433	445

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

3.3.1 Airport and Public Infrastructure

The Kongiganak Airport currently has a 1,885 x 35 foot gravel runway that is reportedly in poor condition with ruts and puddles (AirNav, 2009). An extension project began in 2007 that will extend the runway to 2,400 feet in length. This project is primarily funded by an FAA grant for $10.6 million, with a total project cost of $11.1 million (DCCED, 2009). The Yukon-Kuskokwim Delta region is a challenging area for airport projects because of the environmental conditions and lack of suitable material to use for fill. The Kongiganak runway construction process will take approximately five years to complete because of time needed for soil settling (Chapman, J., 2009).

According to the City of Kongiganak, expected benefits from the extension project are mainly related to improved air service (Nicoli, M., 2009). Air service is currently limited by several factors. The runway is unlit, so planes are unable to land when it is dark. During the fall and spring seasons, when rain is heaviest or snow is melting, planes are unable to land because the runway is too soft or it is flooded (Nicoli, M., 2009). According to air carriers, the current runway is very short and bumpy, and lengthening and improving the runway surface along with adding runway lights will make operating in Kongiganak much safer and easier (Richardson, W., 2009).

According to the Alaska Department of Commerce, Community, and Economic Development (DCCED), there are some other major infrastructure improvements underway for Kongiganak, including a water treatment system, washeteria, and sewage lagoon. Heat and electricity is provided to residents by Puvurnaq Power Company, a privately owned power company with a 300 kW diesel generator (DCCED, 2009). There are no docking facilities, but barges are still able to deliver fuel a few times a year (Nicoli, M., 2009).

3.3.2 Local Economy

Most residents in Kongiganak practice a subsistence lifestyle of hunting and fishing. The local school is a major source of employment for the community. The remaining employment is with village services, stores, and commercial fishing. Poor returns and reduced salmon prices in recent years have affected the local economy, and reduced the number of residents that are active in commercial fishing. Figure 18 shows the community taken from an airplane in spring 2009.

Figure 18. Kongiganak

Source: Rebecca Cronkhite, 2009

Based on the last biennial Census, 267 people had the potential to be in the workforce in 2000, that is they were 16 years and older and residing in Kongiganak. Approximately half of this population was in the workforce, while almost 49 percent did not participate in the workforce (unemployed and not seeking work). In 2000, the unemployment rate was 3.5 percent (U.S. Census Bureau, 2009). The median per capita income was $9,881 and the median household income was $33,250. Most residents of Kongiganak supplement their income by practicing a subsistence lifestyle of hunting and fishing (Sepez, 2005).

There are no commercial fish processors in Kongiganak, but there are commercial fishers who sell their catch to floating processors or processors located in other communities, that then barge the fish out once it is processed and frozen (Nicoli, M.,

2009). Commercial fishing catch by Kongiganak residents has declined from the higher volumes experienced in the 1990s. In 1990, 420,965 pounds of fish was landed and in 1995, 647,399 pounds of fish was landed. As shown in Table 27, during the past nine years commercial fish harvests by Kongiganak fishers have ranged from a high of 282,260 pounds in 2000 to a low of 87,314 pounds in 2002. The number of permits held and fished has declined too. In 1990 there were 49 permits held. In 2000 there were 34 permits held and 21 of them fished, and by 2008 there were 16 permits held and 11 fished (CFEC, 2009).

Table 27. Kongiganak Commercial Fishing Activity, 2000 – 2008

	Halibut		Herring		Salmon		Total	
Year	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue
2000	332	$415	9,220	$848	272,708	$162,203	282,260	$163,466
2001	0	$0	7,357	$530	128,955	$47,755	136,313	$48,285
2002	0	$0	0	$0	87,314	$41,259	87,314	$41,259
2003	0	$0	5,963	$250	128,319	$61,181	134,282	$61,431
2004	0	$0	0	$0	180,684	$82,029	180,684	$82,029
2005	0	$0	0	$0	162,623	$84,556	162,623	$84,556
2006	0	$0	0	$0	129,992	$61,022	129,992	$61,022
2007	0	$0	0	$0	123,767	$64,935	123,767	$64,935
2008	579	$1,281	0	$0	115,209	$60,102	115,789	$61,383

Source: Developed by Northern Economics using proprietary algorithms with data from Annual CFEC Reports, 2009.

With no registered fish processor in Kongiganak, there are no air shipments of commercial fish out of the community.

3.3.3 Air Carrier Activities

Table 28 and Figure 19 show passenger arrivals and departures for 2002 through 2008. Grant Aviation, Hageland, and Yute Air provide the majority of passenger air service in Kongiganak. The number of passengers has generally increased since 2002, although 2008 arrivals and departures were below the peak experienced in 2006.

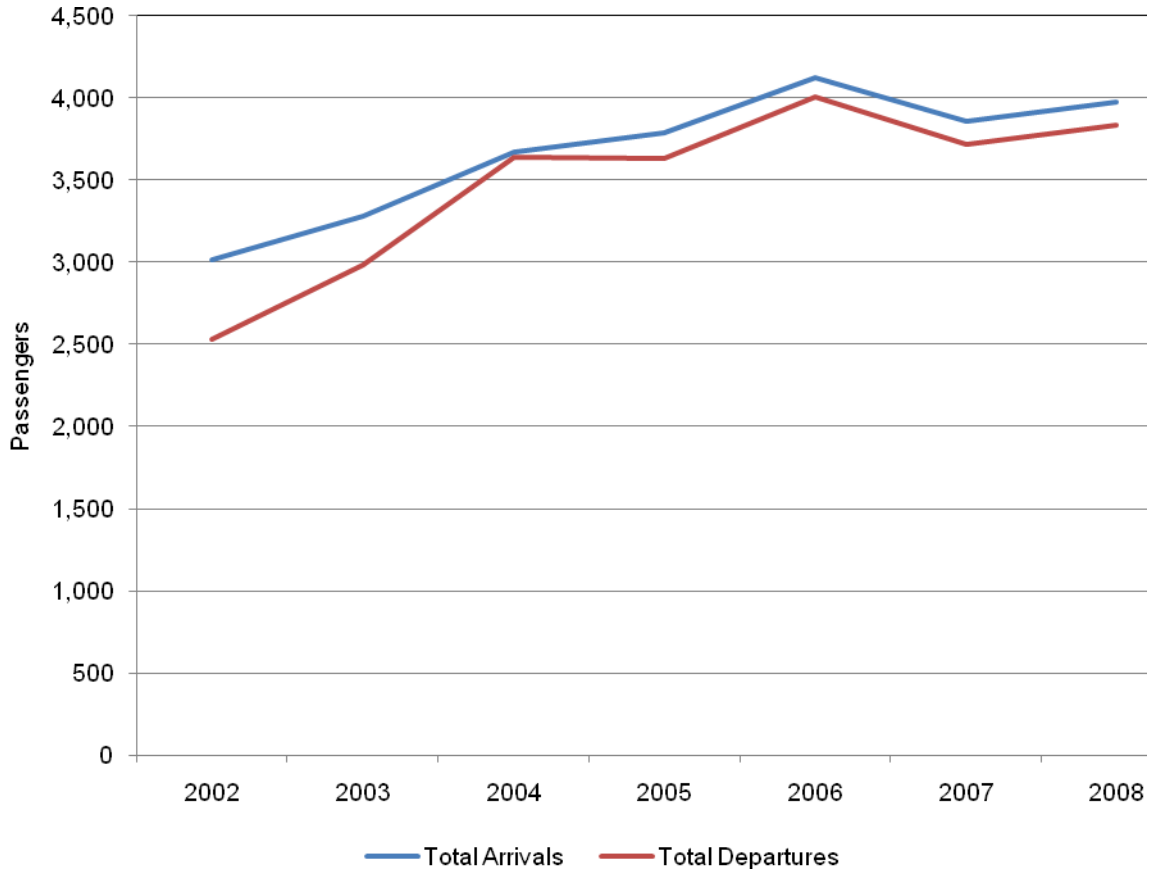
Table 28. Kongiganak Passenger Arrivals and Departures, 2002 – 2008

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Arrivals							
Arctic Circle Air Service	43	31	36	16	42	22	0
Era Aviation	877	890	601	484	272	0	0
Grant Aviation	1,181	1,344	1,112	1,617	1,497	1,403	1,333
Hageland Aviation Service	792	692	1,184	1,006	982	1,019	1,043
Inland Aviation Services	95	151	33	6	30	0	0
Larry's Flying Service	21	36	0	0	0	0	0
Peninsula Airways Inc.	9	3	19	15	7	7	3
Tanana Air Service	0	4	0	0	0	0	0
Yute Air	0	133	688	646	1,292	1,407	1,594
Total Arrivals	3,018	3,284	3,673	3,790	4,122	3,858	3,973
Departures							
Arctic Circle Air Service	35	31	49	18	38	21	0
Era Aviation	631	813	772	531	311	0	0
Grant Aviation	1,127	1,419	1,332	1,813	1,578	1,414	1,411
Hageland Aviation Service	581	429	869	742	813	946	913
Inland Aviation Services	130	120	33	11	18	1	1
Larry's Flying Service	19	31	1	0	0	0	0
Peninsula Airways Inc.	8	6	15	21	0	8	5
Tanana Air Service	0	6	0	0	0	0	0
Yute Air	0	130	569	500	1,250	1,326	1,505
Total Departures	2,531	2,985	3,640	3,636	4,008	3,716	3,835

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 19. Kongiganak Total Passenger Arrivals and Departures, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Kongiganak per flight is shown in Table 29. The number of passengers on flights arriving in Kongiganak increased from 1.6 in 2002 to 2.1 in 2008. Similarly, the number of passengers on flights departing Kongiganak increased from 1.5 in 2002 to 2.1 in 2008. The total number of flights arriving in Kongiganak carrying passengers (along with other items) grew from 2,725 in 2002 to 2,950 in 2008 (BTS, 2009).

Table 29. Kongiganak Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrival by Carrier	**2002**	**2008**
Arctic Circle Air Service	0.2	0.0
Era Aviation	1.9	0.0
Grant Aviation	3.1	2.1
Hageland Aviation Service	2.8	2.7
Inland Aviation Services	1.3	0.0
Larry's Flying Service	0.4	0.0
Peninsula Airways Inc.	0.3	0.8
Average	1.6	2.1
Departures by Carrier	**2002**	**2008**
Arctic Circle Air Service	0.2	0.0
Era Aviation	1.3	0.0
Grant Aviation	3.0	2.1
Hageland Aviation Service	2.4	2.5
Inland Aviation Services	1.6	1.0
Larry's Flying Service	0.4	0.0
Peninsula Airways Inc.	4.0	1.3
Average	1.5	2.1

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Received and shipped air cargo for the community of Kongiganak is shown in Table 30 and Figure 20. Received air cargo has fluctuated between a high of 273,706 pounds in 2008 to a low of 130,173 pounds in 2007. Similarly, the amount of cargo shipped from Kongiganak has fluctuated between a high of 35,899 pounds in 2002 and a low of 19,930 pounds in 2007. Air cargo can vary significantly on an annual basis depending on the level of construction funding for local projects. Arctic Transportation is the major air cargo carrier for Kongiganak.

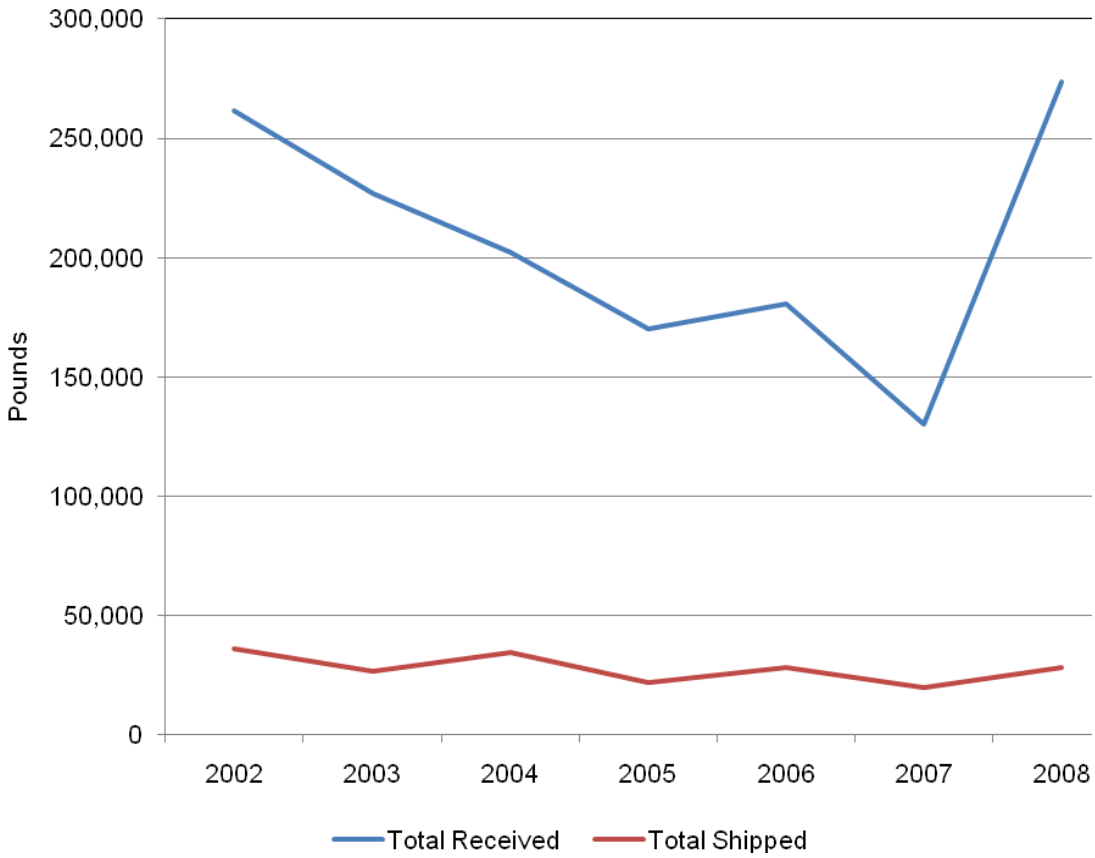
Table 30. Kongiganak Air Cargo Received and Shipped, 2002 – 2008 (Pounds)

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Received							
Alaska Central Express	809	5,447	134	188	0	0	0
Arctic Circle Air Service	208,303	125,580	88,936	77,851	82,176	36,783	7,881
Arctic Transportation	30,271	58,140	63,036	65,753	63,832	73,603	222,939
Bellair Inc.	2,135	1,004	0	0	0	0	0
Era Aviation	3,844	7,172	5,106	2,127	428	0	0
Grant Aviation	3,072	3,566	3,766	7,234	8,709	8,011	11,821
Hageland Aviation Service	7,353	4,520	9,662	15,744	16,819	6,592	20,627
Inland Aviation Services	0	118	486	0	6,094	0	0
Larry's Flying Service	85	70	0	0	0	0	0
Olson Air Service	0	100	0	0	0	0	0
Village Aviation	5,797	21,413	28,558	0	0	0	0
Yute Air	0	14	2,512	1,127	2,561	5,184	10,438
Total Received	261,669	227,144	202,196	170,024	180,619	130,173	273,706
Shipped							
Alaska Central Express	0	80	76	0	0	0	0
Arctic Circle Air Service	21,924	19,314	21,013	7,353	16,329	8,770	0
Arctic Transportation	11,100	1,090	5,054	9,760	8,149	10,534	27,556
Bellair Inc.	128	0	0	0	0	0	0
Era Aviation	0	93	17	4	40	0	0
Grant Aviation	357	600	107	0	55	23	0
Hageland Aviation Service	2,390	5,125	2,643	3,640	3,475	20	167
Inland Aviation Services	543	17	751	1,177	0	0	0
Larry's Flying Service	429	0	0	0	0	0	0
Olson Air Service	0	0	0	0	0	0	0
Village Aviation	0	200	4,842	0	0	0	0
Yute Air Aka Flight Alaska	0	0	76	46	50	583	379
Total Shipped	35,899	26,519	34,579	21,980	28,098	19,930	28,102

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 20. Kongiganak Total Air Cargo Received and Sent, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Kongiganak air mail received and sent between 2002 and 2008 is shown in Table 31 and Figure 21. The amount of received air mail has increased substantially since 2002 and is 250 times larger than the amount of air mail sent from the community. The volume of sent air mail has declined since a peak of 19,067 pounds in 2003.

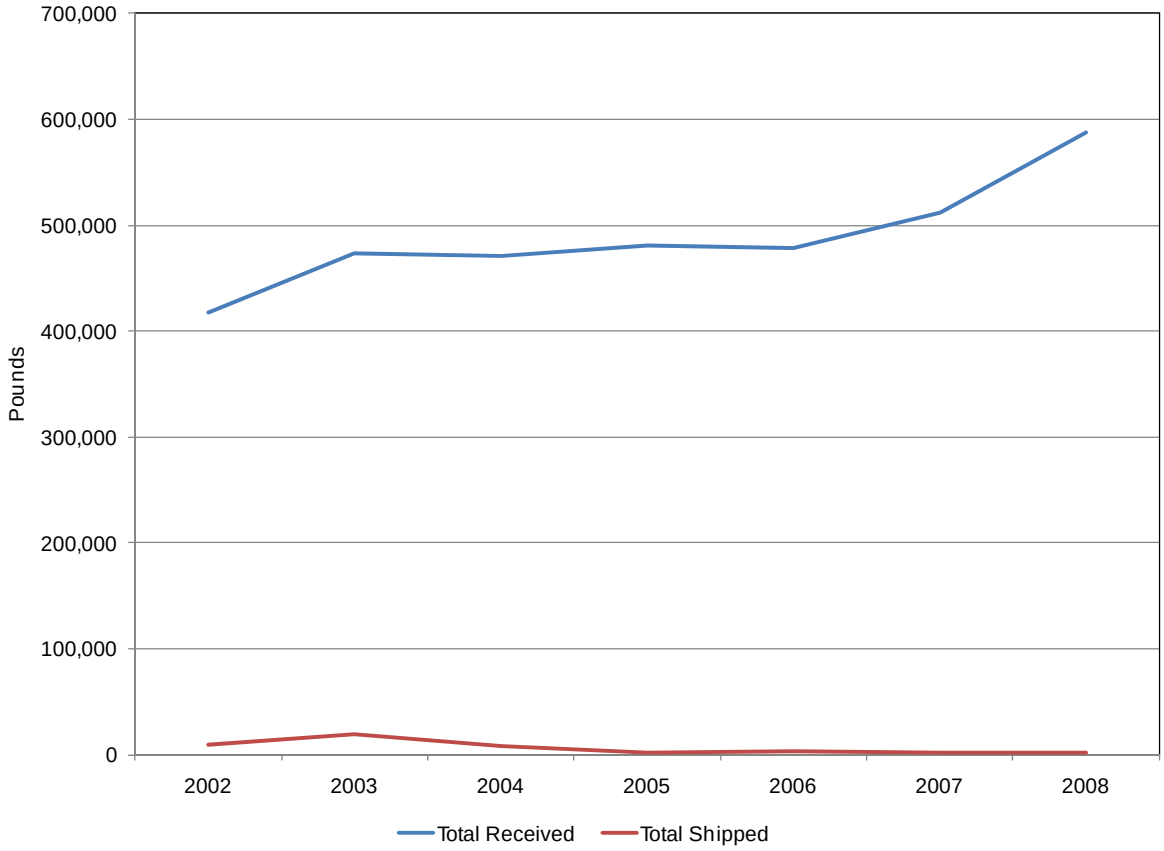
Table 31. Kongiganak Air Mail Received and Sent, 2002 – 2008 (Pounds)

	2002	2003	2004	2005	2006	2007	2008
Received Air Mail							
Alaska Central Express	9,574	32,842	20,581	9,346	0	0	0
Arctic Circle Air Service	31,976	34,181	54,930	52,225	59,932	51,070	4,215
Arctic Transportation	30,912	31,901	32,029	44,473	58,666	62,448	120,193
Bellair Inc.	47,126	32,415	0	0	0	0	0
Era Aviation	19,740	40,338	92,044	20,691	605	0	0
Frontier Flying Service	32,871	23,691	0	0	0	0	0
Grant Aviation	54,503	65,382	100,339	153,419	148,148	146,820	157,681
Hageland Aviation Service	31,308	32,145	89,721	154,058	140,133	112,153	139,808
Inland Aviation Services	32,168	30,209	14,932	13,796	0	0	0
Larry's Flying Service	25,619	32,061	529	0	0	0	0
Olson Air Service	746	23,540	0	0	0	0	0
Tanana Air Service	31,538	28,269	0	0	0	0	0
Village Aviation	35,372	33,936	10,771	0	0	0	0
Yute Air	34,139	31,989	55,543	32,526	71,126	139,011	165,466
Received Air Mail	417,592	472,899	471,419	480,534	478,610	511,502	587,363
Sent Air Mail							
Alaska Central Express	141	4,078	0	0	0	0	0
Arctic Circle Air Service	9	2	0	193	173	153	0
Arctic Transportation	0	395	0	0	203	0	337
Bellair Inc.	0	15	0	0	0	0	0
Era Aviation	733	3,075	1,884	790	453	0	0
Frontier Flying Service	53	296	0	0	0	0	0
Grant Aviation	6,566	9,406	6,019	1,023	268	0	286
Hageland Aviation Service	0	9	48	2	0	76	332
Inland Aviation Services	0	416	0	336	0	0	0
Larry's Flying Service	1,174	0	0	0	0	0	0
Olson Air Service	0	0	0	0	0	0	0
Tanana Air Service	46	0	0	0	0	0	0
Village Aviation	0	0	600	0	0	0	0
Yute Air	408	1,375	167	193	2,377	2,341	1,377
Sent Air Mail	9,130	19,067	8,718	2,537	3,474	2,570	2,332

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 21. Kongiganak Total Air Mail Received and Sent, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Air carriers serving Kongiganak and their fleets are shown in Table 32. Grant Aviation, Hageland, and Yute Air provide the majority of air service.

Table 32. Air Carriers and Fleet Serving Kongiganak in 2008

	Single Engine			Twin Engines							
Air Carrier Name	Cessna 208 Caravan	Cessna C206/207/ 209/210 Stationair	Piper Pa-32 (Cherokee 6)	Beech 1900 A/B/C/D	Beech 200 Super Kingair	Beech King Air C-90	Casa/ Nurtanio C212 Aviocar	Cessna 406 Caravan II and 402/402a	Piper Pa-31 (Navajo)/ T-1020	Shorts 330	Shorts Harland Sc-7 Skyvan
Arctic Circle Air Service (1)	0	0	0	0	0	0	0	5	0	2	0
Arctic Transportation (2)	0	4	0	0	0	0	4	0	0	0	0
Grant Aviation (3)	7	17	0	0	1	0	0	0	4	0	0
Hageland Aviation Service (4)	4	4	0	4	0	0	0	4	0	0	0
Yute Air Aka Flight Alaska (5)	0	12	0	0	0	0	0	0	0	0	0
Grand Total	11	37	0	4	1	0	4	9	4	2	0

Source: (1) Singsaas, D. Arctic Circle Air Service, 2009. (2) Brown, M. Arctic Transportation, 2009. (3) Richardson, W. Grant Aviation, 2009. (4) Hageland Aviation Service, 2009 (5) Dudley, E. Operations Director for Yute Air, 2009.

Note: Arctic Circle Air Service has 5 Cessna 402s and Hageland Aviation Service has 4 Cessna 406 Caravans.

Table 33 shows arrivals by aircraft type in 2002 and 2008. Currently, carriers are quite limited in the aircraft they can fly into Kongiganak due to the length of the runway (1,885 feet). As shown in Table 33, the primary aircraft used in Kongiganak are single engine or small twin engine aircraft. In 2008, 83 percent of arrivals in Kongiganak were completed by Cessna 206, 207s, or similar aircraft. Yute Air, one of the major air carriers for Kongiganak, has developed a niche with serving small communities like Kongiganak with small aircraft. Yute Air has no plans to purchase larger aircraft because they focus on providing regular service to small, isolated communities like Kongiganak and do not wish to compete on the basis of faster aircraft or more passengers (Dudley, R., 2009).

Table 33. Kongiganak Arrivals by Aircraft Type, 2002 and 2008

Aircraft Name	2002		2008	
	Value	Percent	Value	Percent
Casa/Nurtanio C212 Aviocar	34	1.3	80	2.7
Cessna 172 Skyhawk	78	2.9	1	0.0
Cessna 208 Caravan	218	8.1	407	13.8
Cessna C206/207/209/210 Stationair	1,559	57.8	2,451	83.1
Dehavilland Twin Otter Dhc-6	410	15.2	0	0.0
Piper Pa-31 (Navajo)/T-1020	25	0.9	4	0.1
Piper Pa-32 (Cherokee 6)	301	11.2	0	0.0
Shorts Harland Sc-7 Skyvan	58	2.1	5	0.2
Volpar Turbo 18	16	0.6	0	0.0
Grand Total	2,699	100.0	2,948	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

The direct operating costs, capacity, and minimum runway length for several of the aircraft owned by air carriers serving Kongiganak in 2008 are shown in Table 34. Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft. Direct operating costs include aircraft fuel, flight crew salaries, insurance, maintenance, and aircraft depreciation.

Table 34. Aircraft Direct Operating Cost Estimates, Capacity, and Minimum Runway Length

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum payload (Pounds) [1]	Possible passenger seats [2]	Minimum runway length (Feet) [3]
Casa/Nurtanio C212 Aviocar	$1,192	16,975	5,000	19	2,950
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	NA
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	2,000
Shorts Harland Sc-7 Skyvan	$9,986	12,500	5,156	19	3,450

Sources: Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] Maximum payload will decrease depending on the amount of fuel required for each flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo than the maximum amount shown in the table.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate.

3.3.4 Community Impacts from Runway Extension

It is unlikely that the runway extension by itself will cause a large increase in economic activity for the community of Kongiganak. There are no commercial fish processors located in the community, so it is not expected that large amounts of processed fish could be sent from the airport. In addition, as described in section 3.3.2, the estimated pounds harvested by Kongiganak-based fishers have declined over the last eight to nine years.

Air service and safety to Kongiganak will improve with the runway extension, assuming that the extension will also include improved runway surface and runway lights. Kongiganak is located 67 air miles from the closest inpatient medical facility at Bethel, Alaska, so runway improvements that increase accessibility to the community will help with the provision of medical services, especially in case of emergencies (FAA, 2001).

The runway extension is not expected to affect the passenger fares charged by the main passenger air carriers serving Kongiganak—Grant Aviation, Hageland, and Yute Air. According to Hageland Aviation Services, if a larger aircraft is flown to Kongiganak after the extension, passenger fares may increase slightly to cover the cost of flying the larger plane (Thurston, P., 2009). Yute Air operates 12 Cessna 206s, small single-engine aircraft that require a 1,500 foot runway length (Kongignak's runway is currently 1,885 x 35 feet). Yute Air has no plans to add larger aircraft to their fleet because the Cessna 206 fits their market niche of remote Alaska communities and wilderness destinations (Dudley, R., 2009).

There could potentially be a decrease in the cost of shipping cargo to and from Kongiganak, but this depends upon the prices negotiated between the customer and the air carrier and is not a guaranteed result of a runway extension. Currently, Arctic Transportation provides the majority of cargo transport in Kongiganak (transporting 222,939 of 273,706 pounds delivered in 2008), with scheduled cargo service three days per week. It may be possible for Arctic Transportation to serve Kongiganak at a slightly lower cost if they are able to fly their CASA 212 rather than their Cessna 207.

Table 35 shows a cost comparison between shipping cargo to or from Kongiganak via an Arctic Transportation charted aircraft—either a Cessna 207 or CASA 212. The comparison is based on flying freight between the regional hub of Bethel and Kongiganak, with the chartered aircraft making a round-trip. According to Arctic Transportation, they are currently able to fly the CASA 212 to Kongiganak when there are no winds and the plane must have a very light load for takeoff (Brown, M., 2009). Once the runway is extended to 2,400 feet, Arctic Transportation could

provide more reliable service and overall cargo shipping costs may possibly decrease.

Table 35. Cost Comparison for Cargo Shipment between Bethel and Kongiganak

	Payload (Pounds)	Hourly operating cost	Per pound shipping cost	Delivery cost estimate	
				5,000 pounds	100,000 pounds
Cessna 207	1,000	$525	$.52	$5,200	$104,000
CASA 212	5,000	$2,100	$.42	$3,150	$63,000
			Difference	$2,050	$41,000

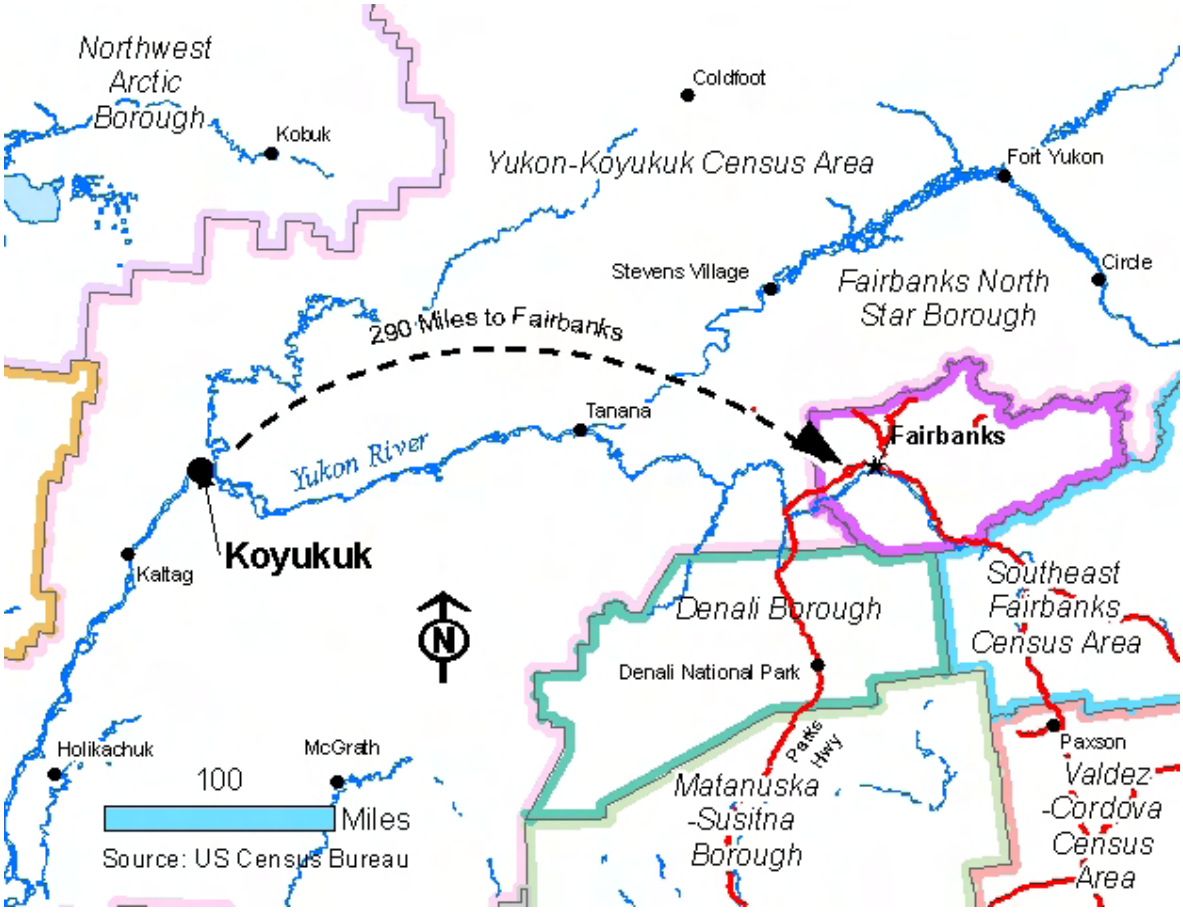
Source: Northern Economics, Inc. calculations based upon communications with Arctic Transportation (Brown, M., 2009).

Notes: Payload amount per plane is based on estimates provided by Arctic Transportation. The Cessna 207 flies at 110 knots per hour, so it is assumed to take two hours round-trip including offloading. The CASA 212 travels at 160 knots and takes 1.5 hours round-trip.

3.4 Koyukuk

The City of Koyukuk is located in a remote and largely undeveloped part of north-central Alaska in the Middle Yukon River Basin along the Yukon River near the mouth of the Koyukuk River (DCCED, 2009). It is 30 miles west of Galena, Alaska, and 290 air miles west of Fairbanks, adjacent to the Koyukuk National Wildlife Refuge and the Innoko National Wildlife Refuge. Figure 22 provides an overview of the location of Koyukuk in relation to other communities and geographic areas of interest. Koyukuk experiences a cold, continental climate with extreme temperature differences.

Figure 22. Geographic Location of Koyukuk



Source: Alaska Map Company, 2009.

Koyukuk's population is primarily Alaska Native, with over 90 percent of the population reported by the 2000 U.S. Census as Alaska Native or American Indian,

and less than 10 percent reported as white. As shown in Table 36, from 1990 to 2008, Koyukuk's population declined from 126 to 88, equal to a 2 percent annual rate of decline.

Table 36. Koyukuk Population Estimate, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Koyukuk	126	101	94	99	108	109	97	88	89	88

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

3.4.1 Airport and Public Infrastructure

Koyukuk's state-owned runway was rehabilitated and extended in 2003 largely through FAA grants. The runway project cost approximately $9.3 million and was contracted through ADOT&PF (DCCED, 2009). The gravel runway was expanded to a 4,000 x 75 foot runway with medium intensity runway lights (AirNav, 2009). Prior to the expansion, the runway was 2,645 x 60 feet. Koyukuk Airport covers an area of 287 acres at an elevation of 149 feet above mean sea level.

In addition to the airport, the Yukon River is also heavily traveled when ice free, usually from mid-May through mid-October (DCCED, 2009). Numerous local trails and winter trails to Chance and Nulato are also used by residents. Snowmobiles, ATVs, and riverboats are used for local transportation.

The City of Koyukuk is the electric utility provider. The power source is a diesel generator with a 235 kW capacity.

Koyukuk electricity consumers are eligible for electricity cost subsidization through the PCE program. Based upon the latest PCE statistical report, 25,287 gallons of fuel were used for generation during fiscal year 2007, generating 204,664 kW hours. Fuel is transported to Koyukuk by barge on the Yukon River (ISER, 2008). Bulk fuel storage is available at Yukon Koyukuk Schools (YKSD) (10,800 gallons), City lease from YKSD (63,800 gallons), ADOT&PF (1,000 gallons), Army National Guard (3,000 gallons), and City Fuel Depot (20,400 gallons), for a total storage of 88,200 gallons.

3.4.2 Local Economy

There are few full-time jobs in the community; the city, tribe, clinic, school, and store provide the only year-round employment (DCCED, 2009). Two people have commercial fishing permits, and BLM fire fighting, construction work, and other seasonal jobs are available to residents, though they often conflict with subsistence opportunities. Trapping and beadwork also supplement incomes. Subsistence foods include salmon, whitefish, moose, waterfowl, and berries.

As described by the U.S. Census, the per capita income in Koyukuk in 2000 was $11,342 and the median family income was $31,250. The total potential workforce, or total population over age 16, in 2000 was 68 people, or 67 percent of the population. Twelve people were not employed but actively seeking work, which translates to a 23 percent unemployment rate. Almost 75 percent of employed workers were employed in government positions (city, borough, state, or federal) and about 25 percent were self-employed.

Approximately two-thirds of the households were reported as family households in 2000, with the average family household size of 3.32 household members. When all households are included, the average household size is 2.59 members.

According to the 2000 U.S. Census, there are 55 total housing units in Koyukuk. Approximately 70 percent of the housing units are occupied year-round, and 30 percent (or 16 housing units) were reported as vacant because they are occupied on a seasonal basis only. Twenty-nine homes were owner occupied and the median value of these homes in 2000 was $9,999. The median rent paid for renter-occupied homes in 2000 was $388 per month.

3.4.3 Air Carrier Activities

Table 37 and Figure 23 show Koyukuk passenger arrivals and departures from 2002 through 2008. In the past two years Frontier Flying Service and Warbelow's have provided the majority of passenger service. Larry's Flying Service provided the majority of passenger service in 2002 and 2003, but went out of business in 2005.

The number of passengers generally increased from 2002 to 2006 but declined in 2007 and 2008.

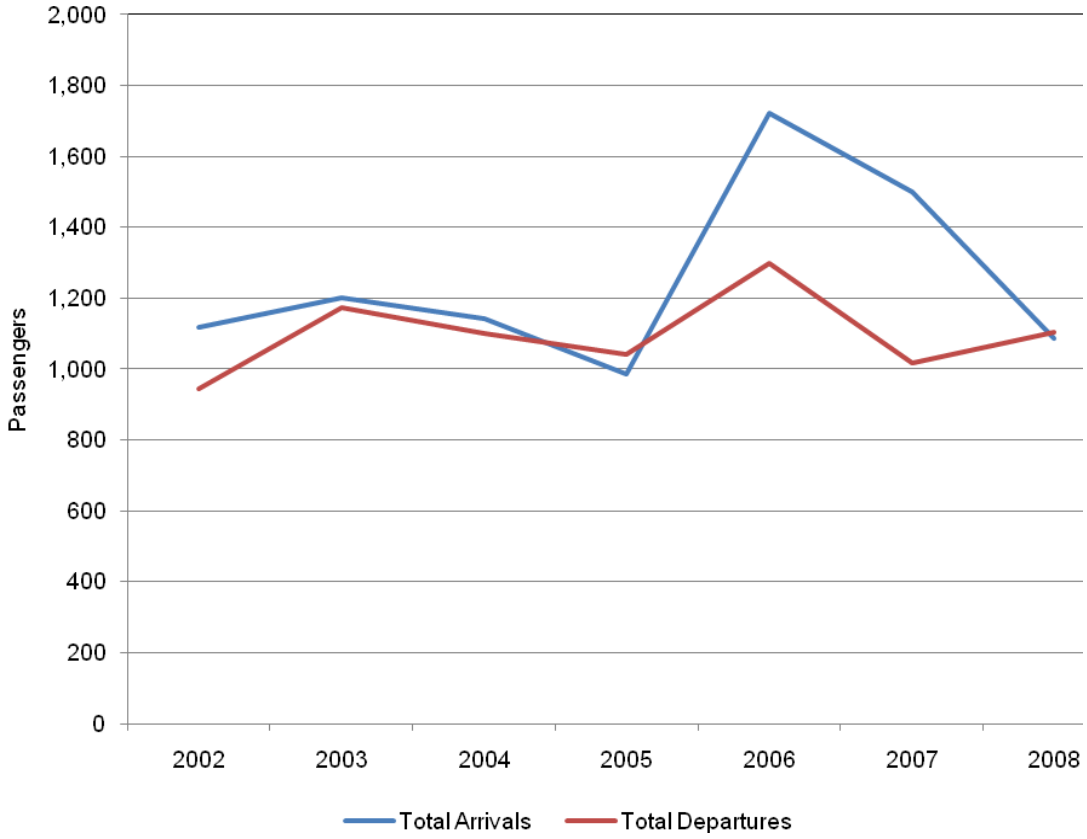
Table 37. Koyukuk Passenger Arrivals, 2002 – 2008

Carrier Air	2002	2003	2004	2005	2006	2007	2008
Passenger Arrivals							
Arctic Circle Air Service	0	2	6	2	0	0	0
Bering Air Inc.	2	2	4	23	4	9	0
Frontier Flying Service	177	342	668	324	991	797	285
Hageland Aviation Service	3	1	19	9	1	1	0
Inland Aviation Services	0	0	0	0	4	0	0
Larry's Flying Service	792	681	194	0	0	0	0
Tanana Air Service	65	66	27	0	0	0	0
Tatonduk Flying Service	61	44	30	8	0	0	0
Warbelow's Air Ventures	5	11	132	586	627	635	767
Wright Air Service	13	54	62	33	81	59	34
Total Arrivals	1,118	1,203	1,142	985	1,721	1,501	1,086
Passenger Departures							
Arctic Circle Air Service	0	0	4	1	0	0	0
Bering Air Inc.	0	18	29	32	20	26	0
Frontier Flying Service	277	313	609	339	538	293	252
Hageland Aviation Service	2	2	2	1	1	1	0
Inland Aviation Services		0	0	0	12	0	0
Larry's Flying Service	543	677	193	0	0	0	0
Tanana Air Service	39	50	21	0	0	0	0
Tatonduk Flying Service	48	57	45	9		0	0
Warbelow's Air Ventures	16	16	129	634	658	651	814
Wright Air Service	19	41	69	27	62	47	37
Total Departures	944	1,174	1,101	1,043	1,300	1,018	1,103

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 23. Koyukuk Total Passenger Arrivals, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Koyukuk per flight is shown in Table 38. The number of passengers on flights arriving in Koyukuk increased from 1.4 in 2002 to 3.0 in 2008. Similarly, the number of passengers on flights departing Koyukuk increased from 1.4 in 2002 to 3.2 in 2008. The total number of aircraft arriving in Koyukuk that carried passengers (along with other items such as freight and mail) declined from 1,275 in 2002 to 945 in 2008 (BTS, 2009).

Table 38. Koyukuk Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	2002	2008
Bering Air Inc.	2.0	0.0
Frontier Flying Service	0.7	3.6
Hageland Aviation Service	2.3	0.0
Larry's Flying Service	4.0	0.0
Tanana Air Service	0.5	0.0
Tatonduk Flying Service	0.6	0.0
Warbelow	2.5	3.3
Wright Air Service	0.2	0.4
Average	1.4	3.0
Departures by Carrier	**2002**	**2008**
Frontier Flying Service	1.4	3.9
Hageland Aviation Service	2.0	0.0
Larry's Flying Service	3.4	0.0
Tanana Air Service	0.4	0.0
Tatonduk Flying Service	0.6	0.0
Warbelow	3.9	3.4
Wright Air Service	0.2	0.4
Average	1.4	3.2

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009).

Table 39 and Figure 24 show received and shipped cargo levels for Koyukuk. Shipped cargo levels are consistently small each year, while received cargo levels increased from 2003 through 2005. The higher received cargo levels are likely related to community capital improvement projects. In 2003 alone, several community projects were underway, including an Indian Housing Block Grant project, a new snow removal equipment building, a new powerhouse for energy generation, and the runway extension project (DCCED, 2009). Since this three-year time period when several community projects were being completed, received cargo levels have decreased.

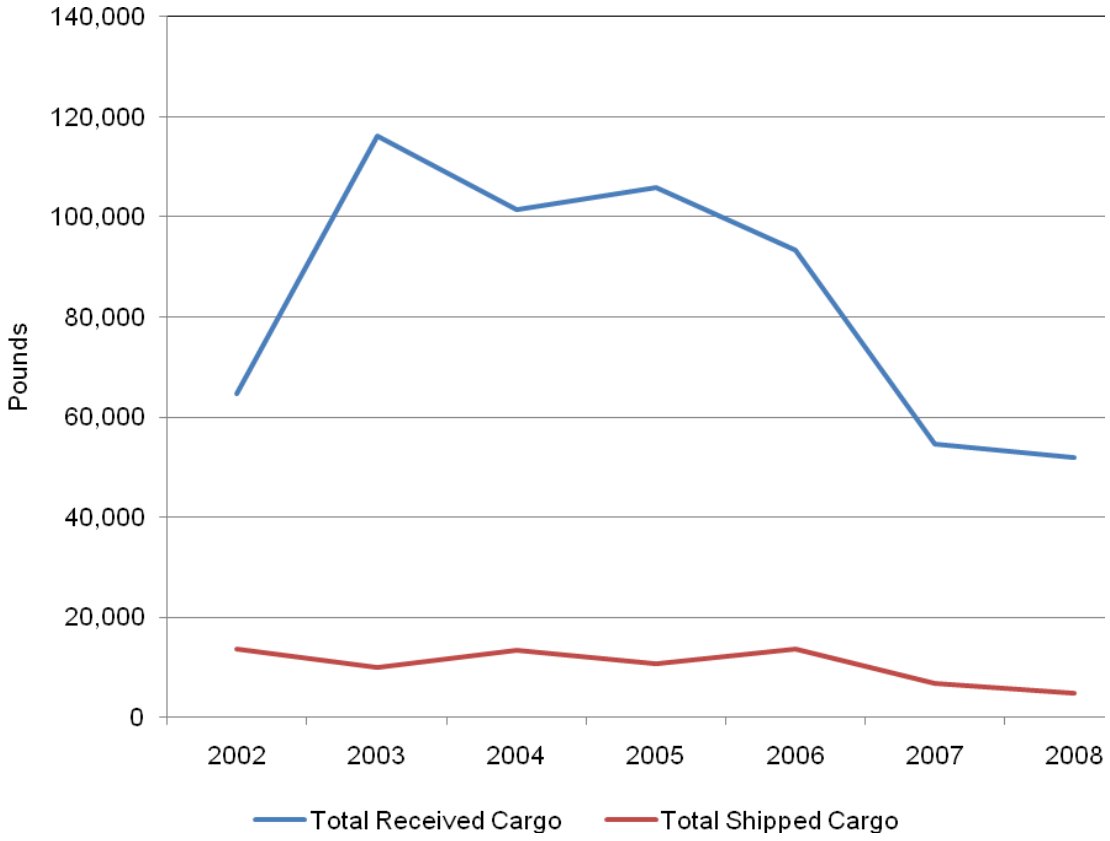
Table 39. Koyukuk Received and Shipped Cargo Levels, 2002 – 2008 (Pounds)

Air Carrier	2002	2003	2004	2005	2006	2007	2008
Received Cargo							
Arctic Circle Air Service	0	5,030	7,555	8,413	10,605	0	0
Bellair Inc.	464	12,026	0	0	0	0	0
Frontier Flying Service	21,751	41,792	33,532	23,336	17,164	10,700	4,646
Hageland Aviation Service	0	0	0	400	0	0	0
Inland Aviation Services	34,598	0	0	0	150	0	0
Larry's Flying Service	11,778	14,962	12,384	0	0	0	0
Servant Air Inc.	588						
Tanana Air Service	11,789	22,431	9,560	0	0	0	0
Tatonduk Flying Service	8,876	2,737	9,368	1,934	0	0	0
Warbelow's Air Ventures	110	0	5,138	39,295	23,624	18,667	29,720
Wright Air Service	9,473	17,090	23,860	32,616	41,885	25,359	17,502
Total Received Cargo	64,719	116,068	101,397	105,994	93,428	54,726	51,868
Shipped Cargo							
Arctic Circle Air Service	0	0	0	0	6,618	0	0
Bellair Inc.	0	0	0	0	0	0	0
Frontier Flying Service	1,056	1,351	6,768	3,938	1,486	1,450	398
Inland Aviation Services	0	0	0	0	1,100	0	0
Larry's Flying Service	1615	4,439	2,794	0	0	0	0
Servant Air Inc.	0	11	0	0	0	0	0
Tanana Air Service	8.056	215	0	0	0	0	0
Tatonduk Flying Service	4,917	2,559	1,041	2	0	0	0
Warbelow's Air Ventures	0	0	1	1,890	1,011	1,470	859
Wright Air Service	2,989	1,360	2,855	4,927	3,369	3,839	3,612
Total Shipped Cargo	13,716	9,935	13,459	10,757	13,584	6,759	4,869

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 24. Koyukuk Total Air Cargo Received and Sent, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Table 40 and Figure 25 show mail volumes received and sent from Koyukuk between 2002 and 2008. Similar to passenger service, the majority of mail is carried by Frontier Flying Service, Warbelow's, and Wright Air Service. As mentioned earlier, passenger carriers to remote Alaska communities are allotted 70 percent of the bypass mail and air freight carriers are allotted 20 percent. Passenger carriers need a 10 percent market share to qualify to carry bypass mail and freight carriers need a 25 percent market share (U.S. Postal Service, 2007). In general, air mail volumes have declined over time; however, received mail volumes have decreased at a significantly slower rate and continue to account for a substantially larger volume than sent.

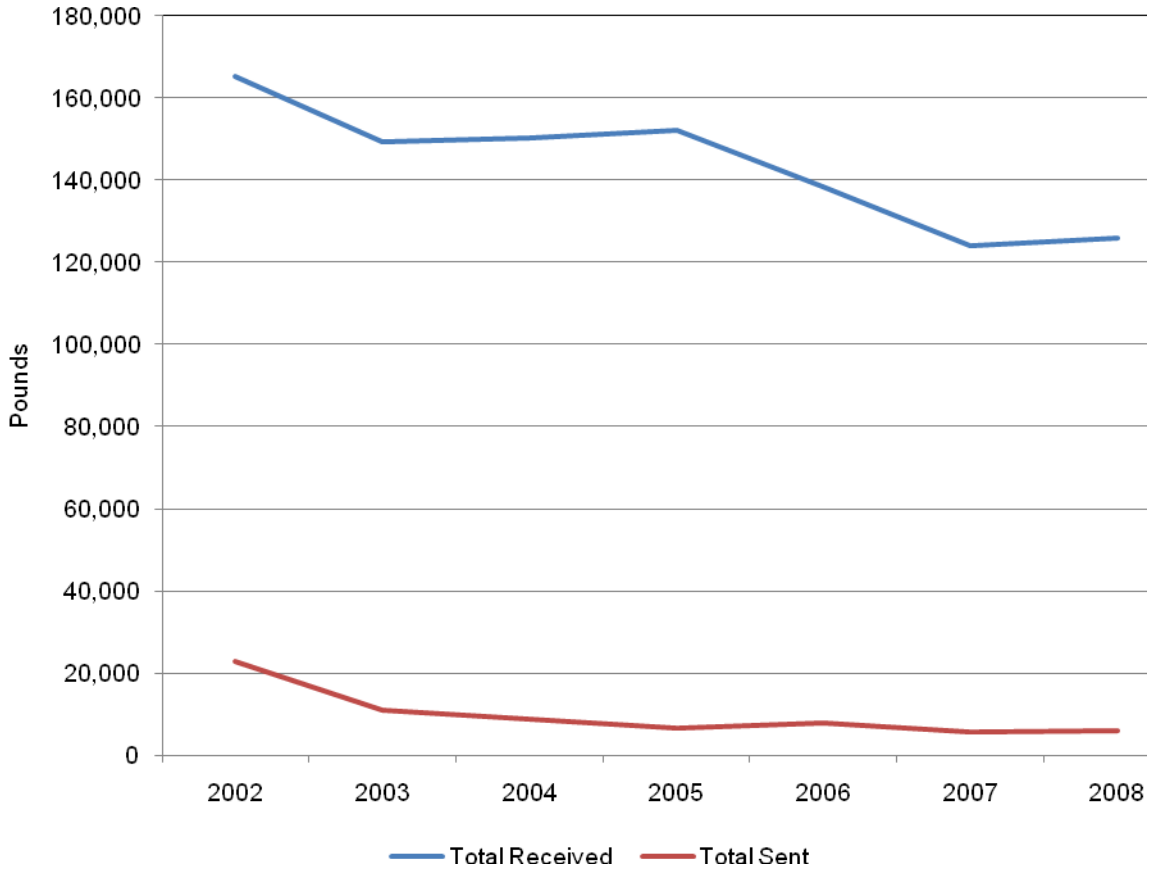
Table 40. Koyukuk Air Mail Received and Sent, 2002 – 2008 (Pounds)

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Bellair Inc.	20,655	16,878	0	0	0	0	0
Frontier Flying Service	29,167	37,376	74,039	83,788	55,842	65,649	74,638
Larry's Flying Service	19,407	13,686	16,945	0	0	0	0
Servant Air Inc.	25,218	16,165	0	0	0	0	0
Tanana Air Service	25,179	23,149	7,684	0	0	0	0
Tatonduk Flying Service	26,319	24,042	24,698	9,317	0	0	0
Warbelow's Air Ventures	0	0	3,775	39,673	55,696	37,410	38,238
Wright Air Service	19,290	18,027	23,039	19,454	26,961	20,929	12,988
Total Received	165,235	149,323	150,180	152,232	138,499	123,988	125,864
Air Mail Sent							
Bellair Inc.	0	0	0	0	0	0	0
Frontier Flying Service	1,504	1,690	4,292	2,986	2,490	1,347	434
Larry's Flying Service	5,424	6,422	2,455	0	0	0	0
Tanana Air Service	0	106	0	0	0	0	0
Tatonduk Flying Service	15942	2,818	0	0	0	0	0
Warbelow's Air Ventures	0	0	774	3,457	5,244	4,388	5,625
Wright Air Service	18,695	0	1,143	193	0	0	0
Total Sent	22,870	11,036	8,664	6,636	7,734	5,735	6,059

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 25. Koyukuk Total Air Mail Received and Sent, 2002 – 2008 (Pounds)



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Air carriers serving Koyukuk in 2008 and their fleets are shown in Table 41. Frontier Flying, Warbelow's, and Wright provide the majority of passenger, cargo, and mail air service.

Table 41. Air Carriers and Fleet Serving Koyukuk in 2008

	Single Engine		Twin Engine				
Air Carrier Name	Cessna 208 Caravan	Cessna C206/207/ 209/210 Stationair	Beech 1900 A/B/C/D	Beech Bonanza 35a/C/D/E/ G/H/J/K/S/ V/36a	Cessna 406 Caravan Ii	Helio H-250/ 295/395	Piper Pa-31 (Navajo)/ T-1020
Frontier Flying Service (1)	0	3	4	0	0	0	7
Hageland Aviation Service (2)	4	4	4	0	4	0	0
Warbelow's (3)	0	4	0	0	0	0	10
Wright Air Service (4)	3	4	0	4	0	4	4
Yute Air Aka Flight Alaska (5)	0	12	0	0	0	0	0
Total	7	27	8	4	4	4	21

Sources: (1) Leaf, R. Frontier Flying Service, 2009. (2) Thurston, P. Hageland Aviation Service, 2009. (3) Morgan, M. Warbelow's, 2009. (4) Wright Air Service, 2009. (5) Dudley, E. Operations Director for Yute Air, 2009.

Koyukuk's runway was extended from 2,645 x 60 feet to 4,000 x 75 feet in 2003. Table 42 shows how aircraft arrivals changed between 2002 and 2008. In 2002, the Piper Pa-31 and the Piper Pa-32 were the two most common aircraft used for flights to Koyukuk, accounting for 46 percent and 34 percent of total aircraft arrivals. In 2008, the Piper Pa-31 increased to 62 percent of total arrivals while the Piper Pa-32 was no longer flown to Koyukuk. Instead, the Beech 1900 aircraft was more heavily utilized, accounting for over 28 percent of total arrivals. The Beech 1900 would have had difficulty landing in Koyukuk prior to the runway extension since it requires a minimum runway length of 3,900 feet (see Table 43).

Table 42. Koyukuk Arrivals by Aircraft Type, 2002 and 2008

Aircraft Name	2002		2008	
	Value	Percent	Value	Percent
Beech 1900 A/B/C/D	31	2.3	274	28.4
Beech Bonanza 35a/C/D/E/G/H/J/K/S/V/ 36a	18	1.3	4	0.4
Cessna 208 Caravan	114	8.4	83	8.6
Cessna C206/207/209/210 Stationair	10	0.7	2	0.2
Land-Piston-Lt 450 Hp	4	0.3	0	0.0
Piper Pa-30/31t Cheyenne Ii Xl	0	0.0	5	0.5
Piper Pa-31 (Navajo)/T-1020	626	46.3	595	61.7
Piper Pa-32 (Cherokee 6)	456	33.7	0	0.0
Piper Pa-34/39 (Twin Comanche)	2	0.1	0	0.0
Volpar Turbo 18	90	6.7	0	0.0
Total	1,352	100.0	964	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

Table 43 shows direct operating cost estimates, payload, and runway requirements for several of the aircraft. Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft.

Table 43. Aircraft Direct Operating Cost Estimates, Capacity, and Minimum Runway Length

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum payload (Pounds) [1]	Possible passenger seats [2]	Minimum runway length (Feet) [3]
Beech 1900 A/B/C/D	$1,127	17,120	5,775	19	3,900
Beech Bonanza 35a/C/D/E/G/H/J/K/S/V/ 36a	$393	3,125	1,125	4 to 6	NA
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	2,000
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	NA
Piper Pa-34/39 (Twin Comanche)	NA	4,200	1,575	5	NA
Volpar Turbo 18	NA	8,727	2,552	6	NA

Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] The carrying capacity available for cargo and/or passengers of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight. Also different versions of the same aircraft specialize in passenger seating or cargo—the Beechcraft 1900C can be configured for passenger seating of 19 or for cargo shipping with a maximum payload of 5,775 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate.

3.4.4 Community Impacts from Runway Extension

The runway extension in Koyukuk has improved airport service and safety, allowing aircraft to take off and land in more inclement weather. According to Mayor Cindy Pilot, the airport is the major piece of transportation infrastructure providing access to the community (2008). After the 2003 extension and runway remediation, the airport provides safer and more reliable air service. Before the extension, flights were often canceled, especially during spring break-up and periods of heavy rain that caused runway flooding. In 2006, the community had a flood but was still able to get people and supplies in and out because of the extended runway. Air access is critical to the community because it is located 289 air miles from the closest inpatient medical facility, in Fairbanks, Alaska. Without reliable air service, Koyukuk residents do not have access to medical services.

Although the runway extension has improved air service for Koyukuk, the mayor said that it has not decreased the price charged for shipping and receiving items (Pilot, C., 2009). This assessment was also confirmed by air carriers. Warbelow's Air Venture carried over 57 percent of total cargo shipped to Koyukuk in 2008—their cargo rates to and from the community have not changed because of the runway extension (Morgan, M., 2009). According to Warbelow's, the only time cargo rates change for a rural community such as Koyukuk is when there is a large increase in the volumes shipped; if volumes increase substantially, an air carrier will negotiate lower rates with the shipper depending on volume totals. According to Warbelow's, the volume of air cargo shipped has a much larger influence on costs than runway length for shipping air cargo to and from remote Alaska communities (Morgan, M., 2009).

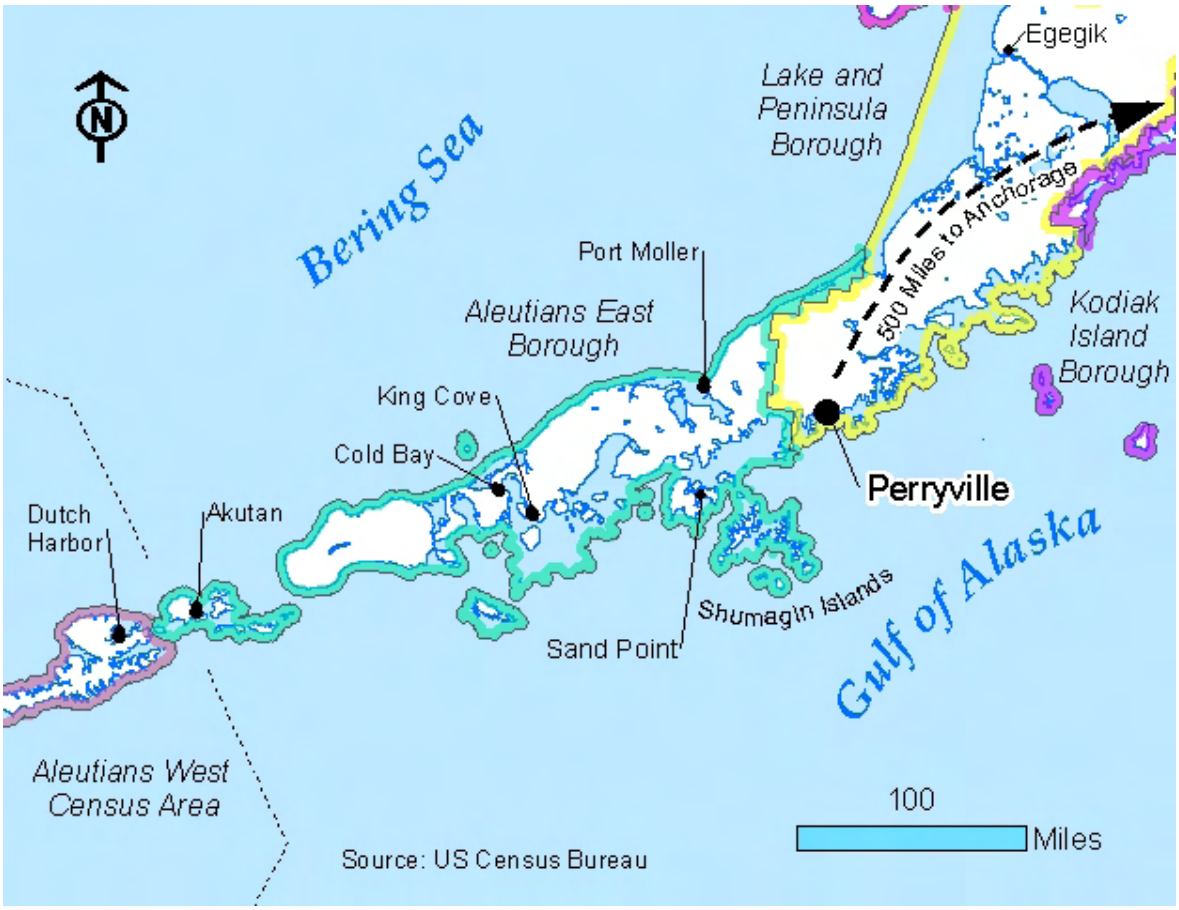
The runway extension led to lower transportation costs when Koyukuk ran out of fuel in winter 2008. Typically Koyukuk has fuel barged to the community two times per year at a transportation/shipping cost of less than $1 per gallon (ISER, 2008). However, the community ran out of fuel in early spring in 2008 and had to fly more in (Birkholz, E., 2009). Fortunately, the runway extension was complete, so the community was able to receive fuel via a DC-6. Although the exact amount of fuel

shipped is not known, the community has a monthly average fuel demand of 3,570 gallons with higher consumption rates expected in the future. If the community had been forced to fly in fuel using a smaller C-46 instead of a DC-6 the fuel would have cost $1.57 more per gallon. So, for each month of fuel the community is forced to fly in, the longer runway is saving it roughly $5,600.

3.5 Perryville

Perryville is located on the south coast of the Alaska Peninsula within the Lake and Peninsula Borough, 275 miles southwest of Kodiak and 500 miles southwest of Anchorage (DCCED, 2009). Perryville's location is shown in Figure 26.

Figure 26. Geographic Location of Perryville



Source: Alaska Map Company, 2009

Although Aleut people have sporadically lived in the area for centuries, the official founding of the unincorporated village of Perryville came in 1912 when the Katmai eruption forced villagers from Katmai and Douglas to relocate (Sepez, et al., 2005). Since that time, Perryville has remained a small community of mostly Aleut residents who depend heavily upon the Chignik salmon fishery. Perryville's population has increased slowly over the last two decades from 108 residents in 1990 to roughly

115 to 120 by the 2006 and 2007. The population jumped to 133 in 2008 as the remaining residents of nearby Ivanof Bay migrated from that community to Perryville.

Table 44. Perryville Estimated Population, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Perryville	108	107	114	111	106	110	114	119	117	133

Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

3.5.1 Airport and Public Infrastructure

The Perryville airport was extended in 2007 from a 2,500 foot runway to a 3,300 x 75 foot gravel runway with medium intensity runway lights (AirNav, 2009). The runway project began in 2005, cost approximately $4.35 million dollars, and was largely covered by an FAA grant (DCCED, 2009). In addition, runway safety areas were upgraded for $1.24 million (again largely covered by an FAA grant) (DCCED, 2009).

Utilities such as water and electricity are supplied by the Native Village of Perryville (Sepez et al., 2005). Electricity is produced by a diesel-fueled generator. Usually, barges from either Crowley Marine or Delta Western deliver fuel and other supplies to Perryville each spring and fall. Bulk fuel storage is available at the Lake and Peninsula Schools (21,900 gallons), and Village Council (72,500 gallons) (DCCED, 2009). The total fuel storage capacity is 94,400 gallons.

Perryville experienced a fuel shortage in 2007, when barged fuel did not arrive as expected, and the community had to fly in fuel.

3.5.2 Local Economy

Perryville's local economy consists of government, commercial fishing, and subsistence activities. Only a few year-round jobs are available. Subsistence harvesting of both marine and land resources is also an important part of the economy (Sepez, et al., 2005). Some residents trap during the winter, and all rely heavily on subsistence food sources; residents harvest salmon, trout, marine fish, crab, clams, moose, caribou, bear, porcupine, and seal.

Approximately 25 percent of community residents are employed by the government, including city, borough, state, and federal sectors (Sepez, 2005). According to the 2000 U.S. Census, over 46 percent of Perryville residents 16 years and older—or 31 of 67 people—are not in the workforce (i.e., unemployed and not seeking work) (U.S. Census Bureau, 2009). The unemployment rate in 2000 was 11.1 percent (U.S. Census Bureau, 2009). The average annual per capita income in 2000 was $20,935 and the average household income was $51,875 (U.S. Census Bureau, 2009).

Commercial fishing is a critical part of the Perryville economy. During the summertime, most of Perryville's commercial fishers leave Perryville to fish in Chignik and Chignik Lagoon. There are no processors in Perryville, but there are a handful of residents that have commercial fishing permits and are active in the salmon, halibut, or other groundfish fisheries. In 2008, there were 12 commercial fishing permits held by Perryville fishers, and 10 of these permits were fished (CFEC, 2008).

Table 45 shows the commercial fish landings and revenue estimates for Perryville permit holders by type of fishery.

Table 45. Perryville Commercial Fish Landings and Revenue Estimates, 2000 – 2008

	Halibut		Other Groundfish		Salmon		Grand Total	
Year	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue
2000	16,066	$41,643	60,873	$18,727	1,023,888	$892,258	1,100,827	$952,628
2001	26,627	$51,252	240,204	$64,050	673,543	$434,557	940,374	$549,859
2002	42,304	$82,722	186,345	$40,474	511,031	$351,794	739,679	$474,990
2003	29,446	$78,788	279,090	$73,900	1,128,761	$752,825	1,437,297	$905,513
2004	35,177	$100,173	314,413	$74,035	520,884	$487,331	870,473	$661,539
2005	26,952	$75,408	312,526	$79,133	649,251	$554,284	988,729	$708,825
2006	20,019	$68,759	294,311	$105,564	712,468	$525,565	1,026,797	$699,887
2007	16,272	$63,098	0	$0	747,633	$476,182	763,905	$539,280
2008	29,594	$91,514	295,998	$168,645	953,874	$642,810	1,279,466	$902,968

Source: Developed by Northern Economics using proprietary algorithms with data from Annual CFEC Reports, 2009.

3.5.3 Air Carrier Activities

Table 46 and Figure 27 show Perryville passenger arrivals and departures from 2002 through 2008. Peninsula Airways is the major passenger air service provider to the community. Since 2005, both arrival and departure passenger volume rates have declined steadily.

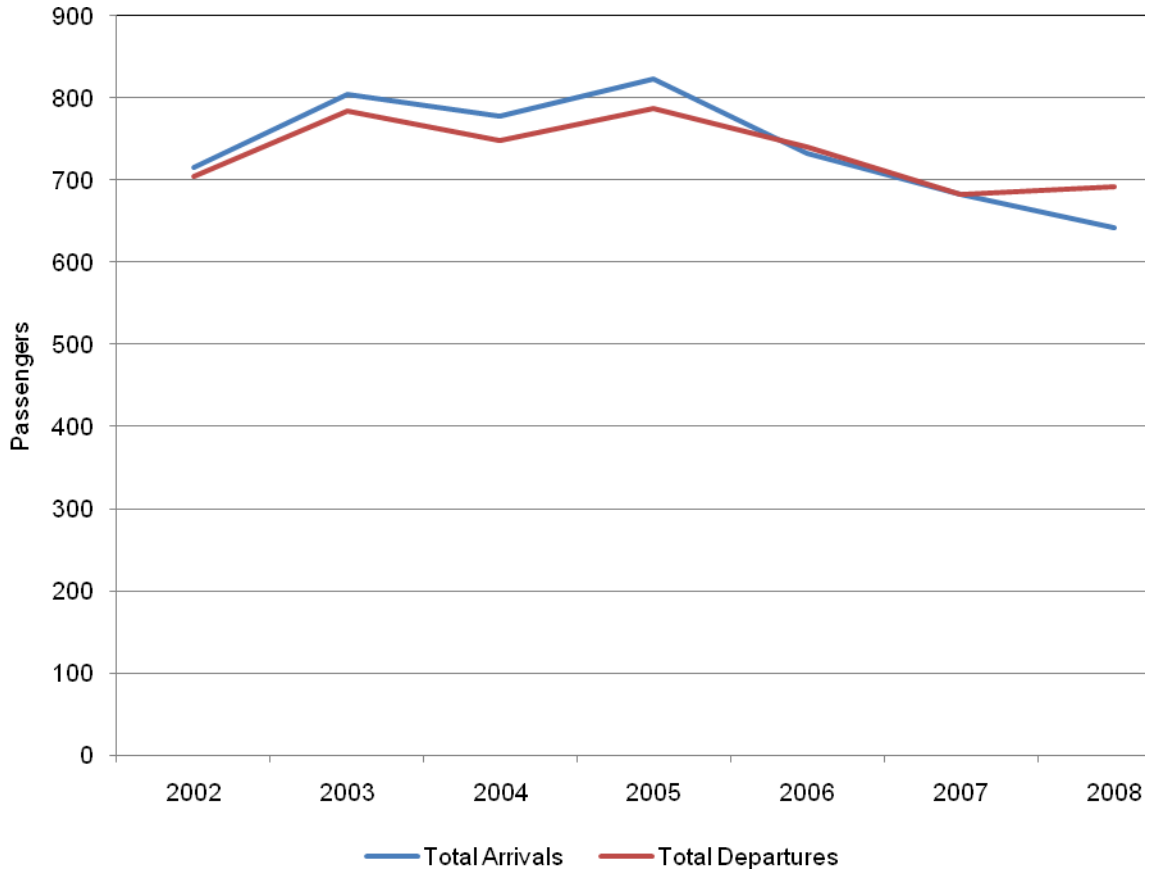
Table 46. Perryville Air Passenger Arrivals and Departures, 2002 – 2008

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Passenger Arrivals							
Iliamna Air Taxi	1	0	0	0	0	2	0
Island Air Service	2	0	0	0	0	0	0
Peninsula Airways Inc.	713	805	778	822	732	680	635
Servant Air Inc.	0	0	0	1	0	1	7
Total Arrivals	716	805	778	823	732	683	642
Passenger Departures							
Iliamna Air Taxi	0	0	0	0	0	0	13
Island Air Service	1	0	0	0	0	0	0
Peninsula Airways Inc.	704	784	748	788	741	682	676
Servant Air Inc.	0	0	0	0	0	1	3
Total Departures	705	784	748	788	741	683	692

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 27. Perryville Total Air Passenger Arrivals and Departures, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Perryville per flight is shown in Table 47. The number of passengers on flights arriving in Perryville increased from 2.1 in 2002 to 2.6 in 2008. Similarly, the number of passengers on flights departing Perryville increased from 2.1 in 2002 to 2.7 in 2008. The total number of flights arriving in Perryville carrying passengers (along with other items) decreased from 370 flights in 2002 to 340 flights in 2008 (BTS, 2009). The total number of departing Perryville aircraft that carried passengers (along with other items such as freight and mail) decreased from 769 in 2002 to 340 in 2008 (BTS, 2009).

Table 47. Perryville Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	**2002**	**2008**
Alaska Central Express	0.0	0.0
Iliamna Air Taxi	1	0
Island Air Service	0.1	0.0
Peninsula Airways Inc.	2.4	2.9
Servant Air Inc.	0.0	1.2
Average	2.1	2.6
Departures by Carrier	**2002**	**2008**
Iliamna Air Taxi	0.0	6.5
Island Air Service	0.1	0.0
Peninsula Airways Inc.	2.5	3.0
Servant Air Inc.	0.0	0.7
Average	2.1	2.7

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Table 48 and Figure 28 show air cargo received and shipped from Perryville from 2002 through 2008. As with passenger air service, Peninsula Airways provides the majority of cargo air service. In the winter of 2007-2008, when Perryville needed fuel transported by air, Everts was unable to provide this service because the local runway was not long enough to accommodate their DC-6 fuel planes, and its C-46 fuel planes were out of operation due to maintenance problems (Alsworth, G., 2008). Perryville contracted with Alaska Central Express (ACE) for fuel delivery. ACE does not have a fuel-tank equipped airplane, and instead had to fly fuel to Perryville using 55 gallon barrels (See Section 3.5.4 for additional detail on this fuel delivery).

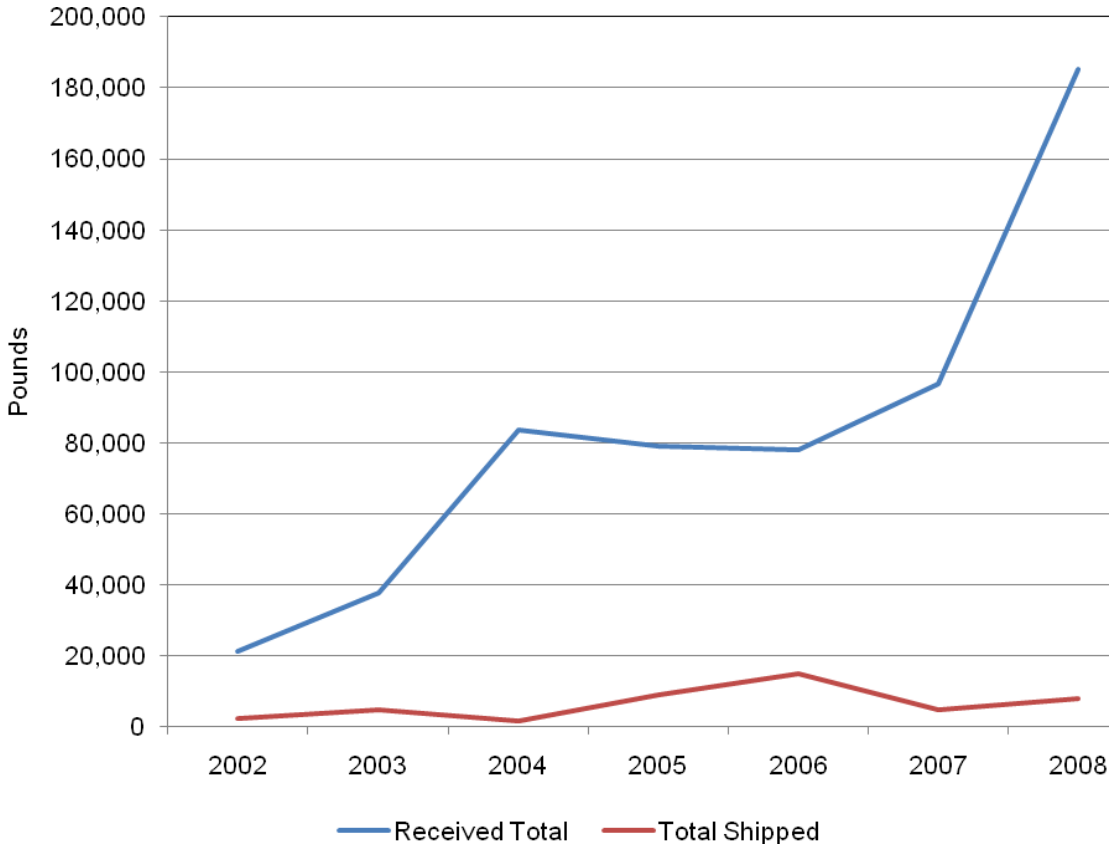
Table 48. Perryville Air Cargo, 2002 – 2008 (Pounds)

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Air Cargo Received							
Alaska Central Express	0	0	0	0	0	12,744	139,502
Arctic Circle Air Service	0	0	0	0	0	17,040	0
Peninsula Airways Inc.	21,345	37,651	83,655	79,206	78,144	66,415	42,701
Servant Air Inc.	0	0	0	0	0	507	2,920
Received Total	21,345	37,651	83,655	79,206	78,144	96,706	185,123
Air Cargo Shipped							
Alaska Central Express	0	0	0	0	0	0	1,190
Arctic Circle Air Service	0	0	0	0	0	0	0
Peninsula Airways Inc.	2,350	4,783	1,724	8,951	14,835	4,607	5,664
Servant Air Inc.	0	0	0	0	0	0	1,150
Total Shipped	2,350	4,783	1,724	8,951	14,835	4,607	8,004

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 28. Perryville Total Air Cargo Sent and Received, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Table 49 and Figure 29 show air mail volumes for 2002 through 2008. While both sent and received mail volumes have increased by over 100 percent since 2002, received mail volumes are 21 times greater than sent volumes. This again highlights the low cost to have items sent by non-priority mail. Similar to passenger and cargo air service, Peninsula Airways provided almost all air mail service from 2002 through 2008.

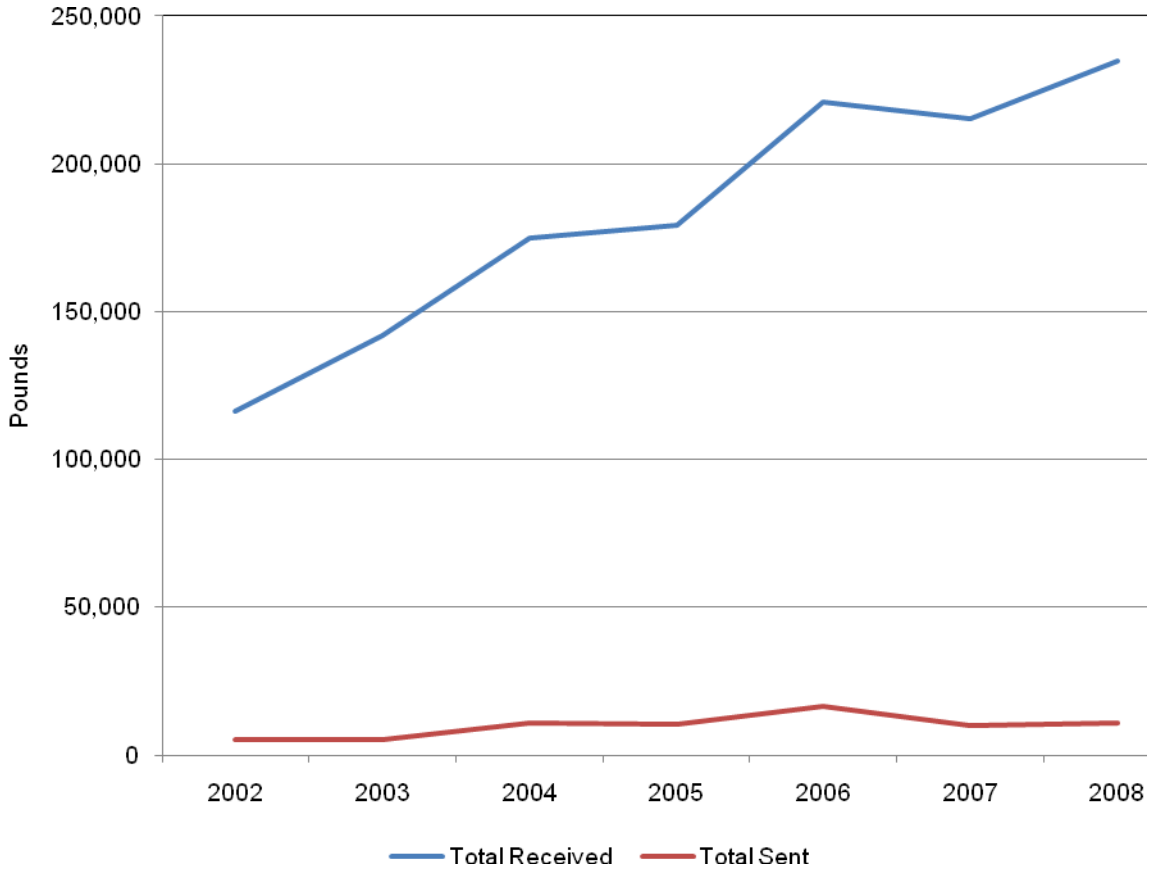
Table 49. Perryville Air Mail, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Alaska Central Express	0	0	0	0	0	0	1,898
Peninsula Airways Inc.	116,324	142,106	174,950	179,260	221,097	215,302	232,854
Total Received	116,324	142,106	174,950	179,260	221,097	215,302	234,752
Air Mail Sent							
Alaska Central Express	0	0	0	0	0	0	0
Peninsula Airways Inc.	5,081	5,330	10,846	10,465	16,447	10,046	11,021
Total Sent	5,081	5,330	10,846	10,465	16,447	10,046	11,021

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 29. Perryville Total Air Mail Sent and Received, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The air carrier fleets serving Perryville in 2008 are shown in Table 50. Given the local market for air service, Peninsula Airways primarily uses their smaller aircraft to provide air service to the community including Cessna 208s, Piper Pa-31s and Piper Pa-32s (Bloomquist, S., 2009).

Table 50. Air Carriers and Fleet Serving Perryville in 2008

	Single Engine		Twin Engine						
Air Carrier Name	Cessna 208 Caravan	Piper Pa-32 (Cherokee 6)	Beech 1900 A/B/C/D	Cessna C-402/402a	Grumman G-21a (Goose)	Piper Pa-31 (Navajo)/T-1020 and Piper T-1T-1040 Turbo	Saab-Fair-child 340/B	Shorts Harland Sc-7 Skyvan and Shorts3330	Swearinga en Metro III
Alaska Central Express (1)	0	0	4	0	0	0	0	0	0
Arctic Circle Air Service (2)	0	0	0	5	0	0	0	2	0
Peninsula Airways Inc. (3)	5	7	0	0	2	2	10	0	4
Grand Total	5	7	4	5	2	2	10	2	4

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Form 298-C, Schedule F-2, Alaska Air Carriers 2008. (1) Hawthorne, G. Alaska Central Express, 2009. (2) Singsaas, D., Arctic Circle Air Service, 2009. (3) Bloomquist, S. Peninsula Airways, 2009.

Notes: Peninsula Airways has one Piper Pa-31 and one T-1040 Turbo.

Aircraft arrivals at the Perryville airport by type of aircraft are provided in Table 51 for 2002 and 2008. In 2008, the Cessna 208 accounted for over 71 percent of total arrivals in Perryville, followed by the Beech 1900 aircraft, which accounted for 10 percent of total arrivals.

Table 51. Perryville Airport Arrivals in 2002 and 2008

Aircraft Name	2002		2008	
	Value	Percent	Value	Percent
Beech 1900 A/B/C/D	0	0.00%	34	10.00%
Cessna 208 Caravan	187	46.40%	243	71.50%
Cessna C206/207/209/210 Stationair	0	0.00%	1	0.30%
Pilatus Britten-Norman Bn2/A Islander	25	6.20%	0	0.00%
Pilatus Pc-12	0	0.00%	2	0.60%
Piper Pa-31 (Navajo)/T-1020	22	5.50%	28	8.20%
Piper Pa-32 (Cherokee 6)	169	41.90%	31	9.10%
Piper T-1040	0	0.00%	1	0.30%
Total	403	100.00%	340	100.00%

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

The direct operating costs, capacity, and minimum runway length for several of the aircraft owned by air carriers serving Perryville in 2008 are shown in Table 52. Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft. Direct operating costs include aircraft fuel, flight crew salaries, insurance, maintenance, and aircraft depreciation.

Table 52. Aircraft Direct Operating Cost Estimate, Capacity, and Minimum Runway Length

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum payload (Pounds) [1]	Possible passenger seats [2]	Minimum runway length (Feet) [3]
Beech 1900 A/B/C/D	$1,127	17,120	5,775	19	3,900
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Pilatus Britten-Norman Bn2/A Islander	NA	6,600	3,012	8	NA
Pilatus Pc-12	NA	10,450	4,583	6 to 8	NA
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	2,000
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	NA
Piper T-1040	$1,324	7000	2617	10	NA

Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] The carrying capacity available for cargo and/or passengers of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight. Also, different versions of the same aircraft specialize in passenger seating or cargo— the Beechcraft 1900C can be configured for passenger seating of 19 or for cargo shipping with a maximum payload of 5,775 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate.

The Cessna 208 can carry up to nine passengers and has a maximum payload capacity of 3,140 pounds. This aircraft requires a minimum runway length of 2,500 feet, so it could have operated safely in Perryville prior to the 2007 extensions (when the runway was extended from 2,500 feet to 3,330 feet). Perryville's runway length of 3,300 feet is shorter than the minimum runway length listed for the Beech 1900 used by ACE for cargo and fuel deliveries to Perryville. In order for larger aircraft to safely land on a shorter runway, air carriers will reduce the aircraft payload by 20 to 50 percent. ACE confirmed that it has reduced the Beech 1900 flying to Perryville to 80 percent of capacity or less, in order to compensate for the shorter runway (Hawthorne, 2009).

3.5.4 Community Impacts from Runway Extension

Similar to other runway extensions, the 2007 Perryville extension improved air safety and access to the community. Improved access and air service are very important for Perryville as this community is located approximately 510 air miles from Anchorage, the location of the closest inpatient medical facility (FAA, 2001). Reliable air service is critical for providing emergency medical care for residents and visitors of Perryville.

Perryville's recent runway extension has not had a substantial impact on economic development activities for the community. The local economy is based on a few year-round positions—approximately 25 percent of the community is employed in government positions while 52 percent of persons 16 years and older are not in the workforce (i.e., unemployed and not seeking work) (U.S. Census Bureau, 2009). Commercial fishing is a critical source of income for some Perryville residents.

As described in section 3.5.2, commercial fishing is a critical part of the Perryville economy. In 2008, there were 12 commercial fishing permits held by Perryville fishers, but there is no commercial fish processing plant located in Perryville; instead local fishers sell their catch to offshore processors or processors located in other communities. Since there are nearby communities with established processors, it is

unlikely that a large commercial fishing processor would ever emerge in Perryville, even if the runway were to be extended beyond its current length of 3,300 feet.

Cargo volumes and passenger levels have not been affected by the runway extension. Similar to other communities, cargo carriers do not anticipate changing their cargo rates unless volumes drastically increase. The volume of air cargo shipped has a much larger influence on costs than runway length for shipping air cargo to and from remote Alaska communities (Morgan, M., 2009).

As shown in Table 46, passenger volumes to and from Perryville have not grown since the 2007 runway extension and have even declined slightly in the past three years. Peninsula Airways is the main passenger carrier for the community, providing almost 99 percent of total passenger service in 2008. Peninsula Airways operates small aircraft to Perryville (like the single-engine Cessna 208) because they fit the size of the passenger market (Bloomquist, S., 2009).

The runway length of 3,300 feet negatively affected the community in 2007 when Perryville's anticipated fuel barge was unable to deliver and fuel was flown into the community. According to the former Lake and Peninsula Borough Mayor, the Village of Perryville was forced to fly fuel in with ACE at a cost of $17.32 per gallon (Alsworth, G., 2008). The extremely high price of fuel was due in part to the high cost of fuel experienced in late 2007 and 2008, and in part to the measures required to fly the fuel in to Perryville; the runway was too short to accommodate the Everts Air Cargo DC-6 tanker, and the two C-46 aircraft operated by Everts Fuel were out of commission due to maintenance problems. This led Perryville to hire ACE to transport the fuel in 55-gallon barrels. The costs incurred for shipping the fuel totaled $15,000 in fuel expense and $9,700 in transportation charges (Keeler, J., 2009).

Table 53 shows the fuel transportation cost estimates based upon the amount of fuel Perryville needed delivered, the cost charged by ACE, and a current cost estimate from Everts Fuel for transporting fuel to Perryville. If Everts were transporting fuel to Perryville, they would fly out of their Kenai, Alaska hub (Adams, D., 2009). Currently,

retail diesel fuel costs $3.47 per gallon in Kenai (Tesoro, 2009).[7] Given the current runway length of 3,300 feet, Everts Fuel would not be able to fly fuel in with their DC-6.

Table 53. Perryville Fuel Transportation Cost Estimates for Air Delivery

Air craft	Costs	Fuel Requirement (in gallons)	Total Cost
Alaska Central Express (1)			
Beech 1900			
Total Cost	$21.39	1,155	$24,700
Fuel Only	$12.99*		$15,000
Transport Cost	$8.40		$9,700
Everts Fuel (2)			
C-46			
Total Cost	$9.46	1,155	$10,926
Fuel Only (3)	$3.47		$4,007
Transport Cost	$5.99		$6,918
DC-6			
Total Cost	$6.96	1,155	$8,038
Fuel Only (3)	$3.47		$4,007
Transport Cost	$3.49		$4,030

Source: (1) Alsworth, G., 2008; (2) Adams, D., 2009; (3) Tesoro, Inc., 2009

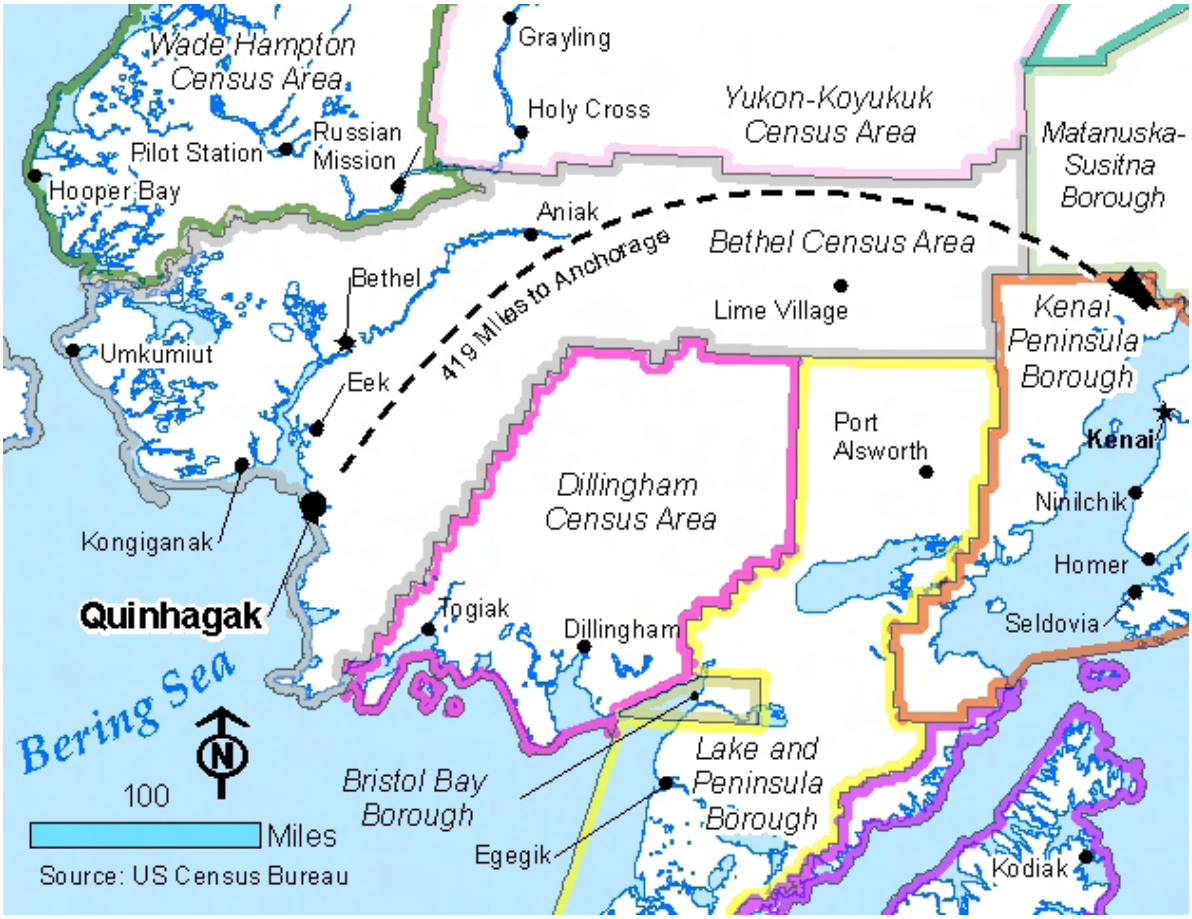
* Note: This extremely high per gallon fuel cost is driven by the fact that Perryville was forced to purchase fuel in 55-gallon drums instead of having the fuel delivered through the normal tanker method.

[7] Analysis assumes prices paid by Everts for fuel purchased in Kenai are similar to retail price.

3.6 Quinhagak

The community of Quinhagak is located on the Kanektok River, on the east shore of Kuskokwim Bay (DCCED, 2009). It is located less than a mile away from the Bering Sea coast and 71 miles southwest of Bethel. The community is in the Bethel Census Area. Figure 30 provides an overview of Quinhagak's location. Quinhagak is a long-established village whose origin has been dated to 1,000 A.D., making it one of the oldest villages in the area (Sepez, et al., 2005).

Figure 30. Geographic Location of Quinhagak



Source: Alaska Map Company, 2009.

The community population is composed primarily of Yup'ik Eskimos. It was formally incorporated in 1975 as a second-class city. Over the last two decades, the community of Quinhagak has slowly been increasing in population growing from 501 residents in 1990 to approximately 661 residents in 2008, experiencing a 1.5 percent annual rate of growth (Table 54).

Table 54. Quinhagak Estimated Population, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Quinhagak	501	555	544	572	577	614	642	649	640	661

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

3.6.1 Airport and Public Infrastructure

Transportation to Quinhagak is possible by air, water, and by land in the winter via trails to Eek and Goodnews Bay (Sepez, 2005). Also, float planes can land on the Kanektok River during certain times of the year. A new airport with a longer runway was constructed in 2004. The runway was improved from a 2,600 x 60 foot gravel airstrip to a 4,000 x 75 foot gravel runway (AirNav, 2009).

The Village of Quinhagak was actively involved with the airport project and coordinated funding from several sources. FAA contributed $2.4 million for the construction of the new airport, while a direct grant from the Economic Development Administration (EDA) to the Native Village provided $1.2 million of the $1.5 million needed for the construction of a longer runway and terminal building (DCCED, 2009). The Denali Commission, Qanirtuuq Inc. (a local business), Native Village of Kwinhagak, DCCED, and the Coastal Village Regional Fund all contributed funds to the airport project (DCCED, 2009).

A new dock and harbor were constructed in Quinhagak in 2002 (DCCED, 2009). Large cargo shipments come in twice a year by barge.

The electric utility owner is Alaska Village Electric Cooperative, while it is operated by Rurla Electric Administration (REA) Co-op and the Quinhagak Village Council. The power source is a 949 kW diesel generator. Bulk fuel storage is available through Lower Kuskokwim Schools (42,200 gallons), City of Quinhagak (12,900

gallons), Village Council (43,700 gallons), AVEC (104,300 gallons), Qanirtuuq/Store (145,200 gallons), Moravian Church (3,700 gallons), A&C Market (9,600 gallons), and Army National Guard (4,500 gallons) (DCCED, 2009). Total fuel storage capacity is 355,100 gallons.

3.6.2 Local Economy

The Quinhagak economy was built upon commercial fishing, the school, and government services (DCCED, 2009). Trapping, basket weaving, skin sewing, and ivory carving are sources of income for residents as well. Subsistence activities remain an important part of residents' livelihood; seal and salmon continue to be staples of residents' diet (DCCED, 2009).

Based on the 2000 U.S. Census, there were 364 residents of Quinhagak age 16 years and older (the potential labor force). About 25 percent of this population was employed in 2000, 59 percent was not in the labor force (unemployed and not seeking work), and 6.3 percent of the labor force was unemployed (U.S. Census Bureau, 2009). Almost 75 percent of workers were employed in government positions (local, state, or federal level). The per capita income in Quinhagak in 2000 was $8,127 and the median household income was $25,156.

Coastal Village Seafoods (CVS) is located in Quinhagak, and is a wholly-owned subsidiary of Coastal Villages Region Fund (CVRF), established in 1999 to operate fish plants in the Kuskokwim Region. The plant purchases fish from both Quinhagak fishers and other commercial fishers that are fishing for salmon within the Kuskokwim/Goodnews Bay District where Quinhagak is located. Sepez, et al. (2005) reported that in 2000, 138 commercial fishing permits were held by Quinhagak residents. However, they further report that 86 permits were issued for salmon and 43 permits were issued for halibut, which totals to 129 permits.

Table 55 shows the estimated amount of salmon processed in Quinhagak from 2000 through 2007. The Quinhagak processor, Coastal Village Seafoods also processes a small amount of halibut.

Table 55. Estimated Salmon Processed in Quinhagak, 2000-2007

Year	Processed Salmon (pounds)	Ex-Vessel Value
2007	3,242,408	$1,377,484
2006	3,354,137	$1,233,758
2005	3,354,444	$1,192,267
2004	4,868,311	$1,566,933
2003	3,687,373	$913,719
2002	1,501,216	$343,637
2001	2,604,706	$803,432
2000	3,652,523	$1,255,652

Source: Commercial Fishing Entry Commission, 2009. Data provided to Northern Economics by request on January 16, 2009.

Note: This estimate is based on Kuskokwim District Set Gillnet Salmon Fishery totals.

Coastal Villages Seafoods supported the runway extension because, as noted in a previous report, one of the largest challenges for the plant has been transporting fresh fish out of Quinhagak (Knapp, G., 2001).

3.6.3 Air Carrier Activities

Passenger arrival and departure levels for the Quinhagak airport are shown in Table 56 and Figure 31 for the years 2002 through 2008. Passenger arrivals and departures increased by 90 percent from 2002 through 2007 and then declined slightly in 2008. Yute Air and Grant Aviation provide most of the passenger air service in Quinhagak.

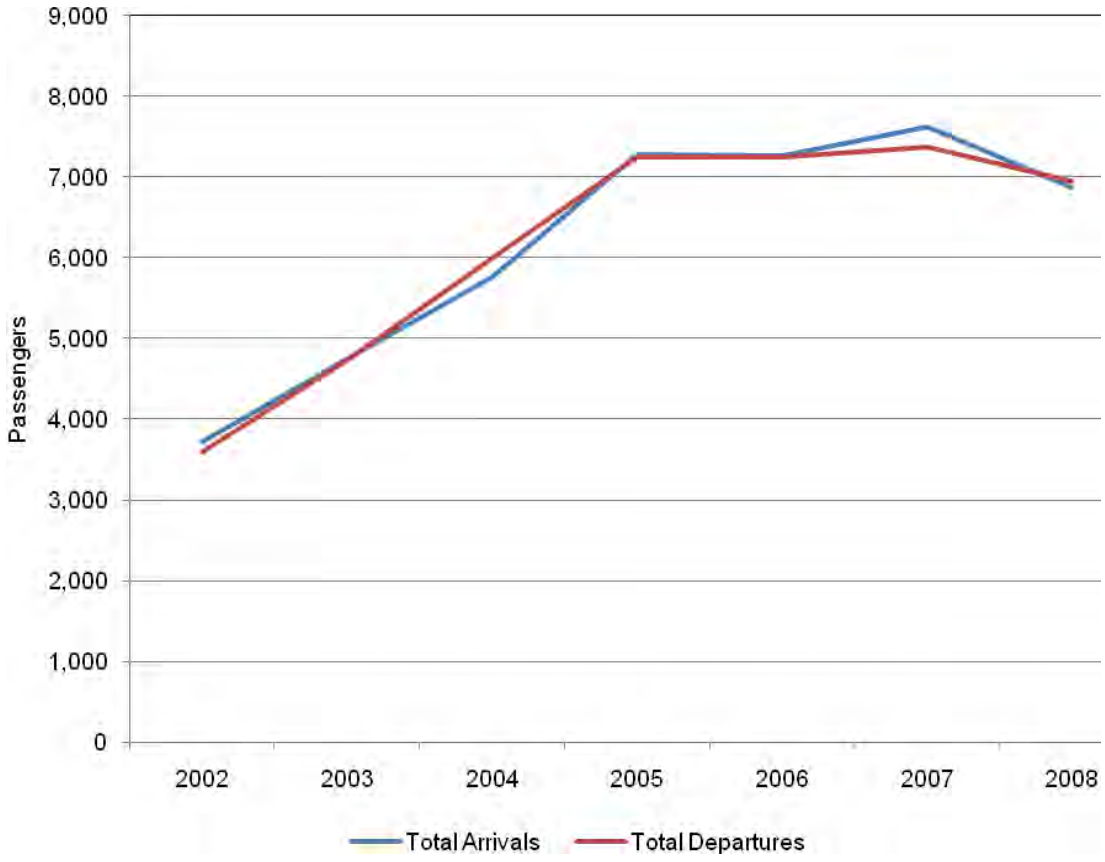
Table 56. Quinhagak Passenger Arrivals and Departures, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Passenger Arrivals							
Arctic Circle Air Service	36	64	60	27	15	43	3
Era Aviation	1,000	913	670	608	694	0	0
Frontier Flying Service	0	1	0	0	0	0	5
Grant Aviation	2,129	2,784	2,683	1,783	1,928	2,369	2,382
Hageland Aviation Service	412	688	706	532	252	696	389
Inland Aviation Services	94	205	54	20	33	55	0
Larry's Flying Service	41	57	0	0	0	0	0
Peninsula Airways Inc.	10	12	10	15	0	0	0
Tanana Air Service	0	4	0	0	0	0	0
Yute Air Aka Flight Alaska	0	19	1,585	4,288	4,347	4,463	4,099
Total Arrivals	3,722	4,747	5,768	7,273	7,269	7,626	6,878
Passenger Departures							
Arctic Circle Air Service	35	28	112	83	81	126	6
Era Aviation	758	1,002	912	646	657	0	0
Frontier Flying Service	0	5	0	0	0	0	3
Grant Aviation	2,004	2,661	2,595	1,755	1,822	2,372	2,445
Hageland Aviation Service	552	619	730	466	237	523	414
Inland Aviation Services	172	218	44	18	34	15	0
Larry's Flying Service	69	88	0	0	0	0	0
Peninsula Airways Inc.	3	26	30	19	25	10	0
Tanana Air Service	0	5	0	0	0	0	0
Yute Air Aka Flight Alaska	0	81	1,579	4,262	4,390	4,327	4,082
Total Departures	3,593	4,733	6,002	7,249	7,246	7,373	6,950

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 31. Quinhagak Total Passenger Arrivals and Departures, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Quinhagak per flight is shown in Table 57. The average number of passengers on flights arriving in Quinhagak increased from 2.1 in 2002 to 2.6 in 2008. Similarly, the average number of passengers on flights departing Quinhagak increased from 2.1 in 2002 to 2.7 in 2008. As shown in Table 56, the total number of flights arriving in Quinhagak carrying passengers (along with other items) increased from 3,722 in 2002 to 6,878 in 2008 (BTS, 2009). The total number of departing Quinhagak aircraft that carried passengers (along with other items such as freight and mail) increased from 3,593 in 2002 to 6,950 in 2008 (BTS, 2009).

Table 57. Quinhagak Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	2002	2008
Alaska Central Express	0.0	0.0
Iliamna Air Taxi	1	0
Island Air Service	0.1	0.0
Peninsula Airways Inc.	2.4	2.9
Servant Air Inc.	0.0	1.2
Average	2.1	2.6
Departures by Carrier	**2002**	**2008**
Iliamna Air Taxi	0.0	6.5
Island Air Service	0.1	0.0
Peninsula Airways Inc.	2.5	3.0
Servant Air Inc.	0.0	0.7
Average	2.1	2.7

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

A motivating factor for extending the runway is the existence of the CVRF salmon processing plant. According to CVS, the volume of fresh salmon processed and shipped out of Quinhagak has increased from approximately 200,000 pounds per season two years ago, to 400,000 pounds per season in 2008 (Hall, J., 2009). Prior to the 2004 runway extension, the biggest load that could be flown out of Quinhagak at one time was about 5,000 pounds; now that the runway is 4,000 feet in length, up to 30,000 pounds of fish can be shipped in one load.

However, as shown in Table 58 and Figure 32, there has not been an increase in the total amount of cargo shipped out. Arctic Transportation has provided the majority of air cargo service for Quinhagak, followed by Grant Aviation and Alaska Central Express.

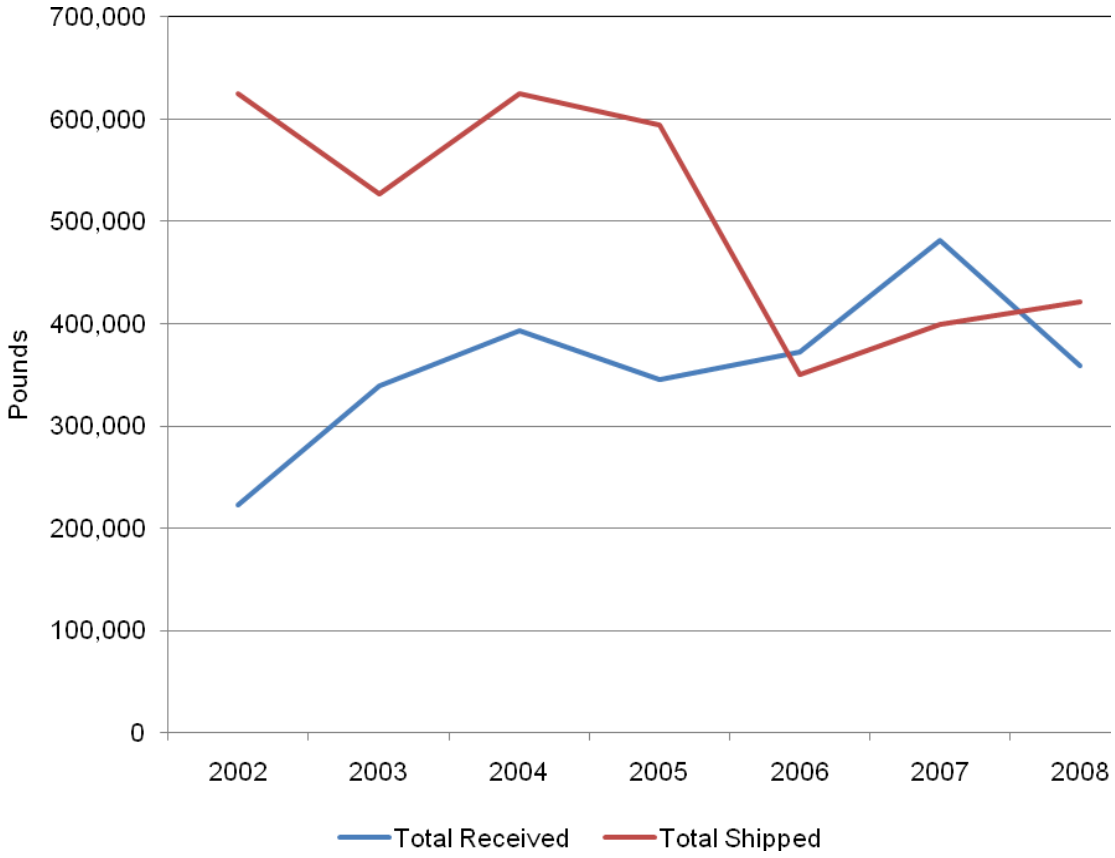
Table 58. Quinhagak Shipped and Received Cargo, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Received Cargo							
Alaska Central Express	0	574	1,188	17,856	15,658	0	5,133
Arctic Circle Air Service	69,006	70,403	96,185	98,526	96,799	154,030	3,885
Arctic Transportation	90,309	120,346	136,171	132,821	171,774	221,643	255,747
Bellair Inc.	19,833	29,495	0	0	0	0	0
Era Aviation	11,241	13,548	16,493	4,836	17,160	0	0
Frontier Flying Service	0	116	0	0	0	0	1,250
Grant Aviation	6,515	10,648	10,229	24,926	25,164	43,109	61,918
Hageland Aviation Service	14,518	12,989	36,781	55,808	28,921	36,188	12,114
Inland Aviation Services	0	210	954	1,341	1,250	0	0
Larry's Flying Service	0	0	0	0	0	0	0
Olson Air Service	0	1,702	0	0	0	0	0
Village Aviation	11,460	79,065	91,395	0	0	0	0
Yute Air	0	0	4,219	9,204	15,424	26,265	19,093
Total Received	222,882	339,096	393,615	345,318	372,150	481,235	359,140
Shipped Cargo							
Alaska Central Express	0	194	0	202,381	88,590	92,182	91,632
Arctic Circle Air Service	6,420	4,592	23,069	7,002	7,756	6,932	0
Arctic Transportation	610,281	515,852	588,363	368,623	204,559	288,241	296,321
Bellair Inc.	0	0	0	0	0	0	0
Era Aviation	818	1,001	391	240	743	0	0
Frontier Flying Service	250	0	0	0	0	0	0
Grant Aviation	622	545	1,016	303	162	2,502	1,803
Hageland Aviation Service	5,443	2,258	4,110	12,912	4,834	5,962	2,460
Inland Aviation Services	468	47	0	2,604	0	0	0
Larry's Flying Service	100	1,800	0	0	0	0	0
Tatonduk Flying Service	0	0	0	0	40,678	0	21,215
Village Aviation	257	48	7,793	0	0	0	0
Yute Air	0	0	534	572	3,488	3,863	7,624
Total Shipped	624,659	526,378	625,276	594,637	350,810	399,682	421,065

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 32. Quinhagak Total Air Cargo Shipped and Received, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Table 59 and Figure 33 show air mail received and shipped from Quinhagak for 2002 through 2008. The volume of mail received is more than 100 times greater than mail sent, again demonstrating the importance to rural communities of ordering items through the mail service at the non-priority mail rate.

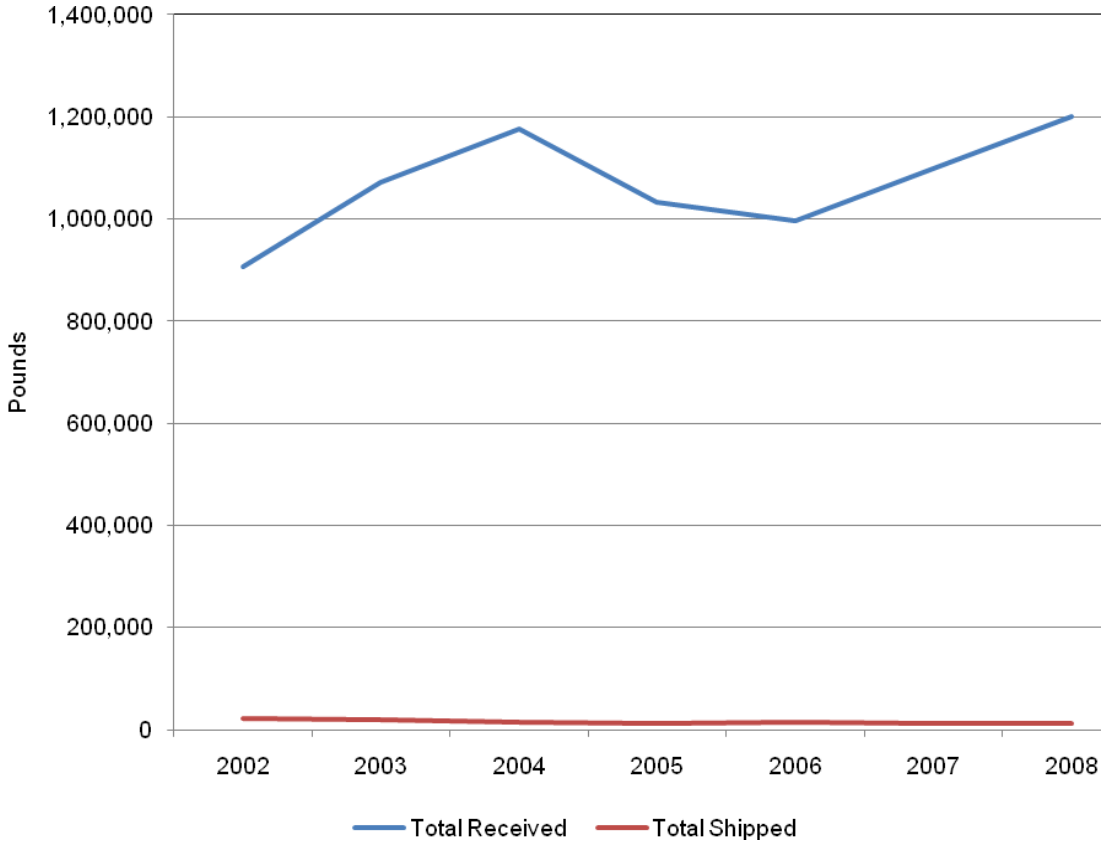
Table 59. Quinhagak Air Mail Shipped and Received, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Alaska Central Express	18,463	76,936	17,980	13,388	0	0	0
Arctic Circle Air Service	92,698	103,184	53,903	35,110	126,944	126,378	20,479
Arctic Transportation	72,921	88,976	127,792	200,439	120,691	130,517	251,806
Bellair Inc.	96,671	75,806	0	0	0	0	0
Era Aviation	69,615	92,574	150,185	24,262	2,426	0	0
Frontier Flying Service	71,632	59,333	0	0	0	0	19,211
Grant Aviation	95,252	128,046	622,415	393,906	325,386	381,292	345,788
Hageland Aviation Service	83,871	86,221	48,815	20,600	457	220	131,291
Inland Aviation Services	75,107	79,742	31,969	22,368	0	0	0
Larry's Flying Service	69,136	75,797	938	0	0	0	0
Olson Air Service	852	53,928	0	0	0	0	0
Peninsula Airways Inc.	0	0	1,000	836	0	0	0
Village Aviation	90,711	77,140	46,524	0	0	0	0
Yute Air	69,352	73,370	74,020	322,310	420,039	460,666	432,520
Total Received	906,281	1,071,053	1,175,541	1,033,219	995,943	1,099,073	1,201,095
Air Mail Shipped							
Alaska Central Express	0	2,343	34	0	0	0	0
Arctic Circle Air Service	779	1,206	1,047	769	1,094	480	0
Arctic Transportation	2,023	294	254	351	317	1,080	1,392
Bellair Inc	0	0	0	0	0	0	0
Era Aviation	3,057	7,887	6,533	2,143	2,276	0	0
Frontier Flying Service	311	0	0	0	0	0	0
Grant Aviation	12,445	5,442	4,984	232	460	332	2,053
Hageland Aviation Service	871	179	169	884	423	599	692
Inland Aviation Services	0	0	668	9	0	0	0
Larry's Flying Service	927	96	0	0	0	0	0
Olson Air Service	0	0	0	0	0	0	0
Peninsula Airways Inc.	0	0	0	0	0	0	0
Village Aviation	0	0	0	0	0	0	0
Yute Air	1,704	1,344	2,109	7,735	10,497	10,865	7,397
Total Shipped	22,117	18,791	15,798	12,123	15,067	13,356	11,534

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 33. Quinhagak Total Air Mail Shipped and Received, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Table 60 shows the fleets of air carriers serving Quinhagak in 2008. Arctic Transportation, Grant Aviation, and Yute Air provide most of the passenger, cargo and mail service.

Table 60. Air Carriers and Fleet Serving Quinhagak in 2008

	Single Engine		Twin Engine					
Air Carrier Name	Cessna 208 Caravan	Cessna C206/207/209/210 Stationair	Piper Pa-31 (Navajo)/T-1020	Beech 1900 A/B/C/D	Beech 200 Super Kingair	Casa/ Nurtanio C212 Aviocar	Cessna C-402/402a and 406	Shorts 330
Alaska Central Express (1)	0	0	0	4	0	0	0	0
Arctic Circle Air Service (2)	0	0	0	0	0	0	5	2
Arctic Transportation (3)	0	4	0	0	0	4	0	0
Grant Aviation (4)	7	17	4	0	1	0	0	0
Hageland Aviation Service (5)	4	4	0	4	0	0	4	0
Yute Air Aka Flight Alaska (6)	0	12	0		0	0	0	0
Total	11	37	4	8	1	4	9	2

Source: (1) Hawthorne, G., Alaska Central Express, 2009. (2) Singsaas, D. Arctic Circle Air Service, 2009. (3) Arctic Transportation, 2009. (4) Richardson, W. Grant Aviation, 2009. (5) Thurston, P. Hageland Aviation Service, 2009. (6)Dudley, E. Operations Director for Yute Air, 2009.

Quinhagak airport arrivals by aircraft type in 2002 and 2008 are shown in Table 61. Although the 2004 runway extension increased Quinhagak's runway from 2,600 feet to 4,000 feet, the extension did not result in an increase in the percent of large aircraft using the new runway. Table 61 shows that the percent of airport arrivals completed by Cessna 206s, 207s and similar small single engine aircraft increased between 2002 and 2008, accounting for over 80 percent of Quinhagak airport landings in 2008.

Table 61. Quinhagak Arrivals by Aircraft Type, 2002 and 2008

	2002		2008	
Aircraft Name	**Value**	**Percent**	**Value**	**Percent**
Beech 1900 A/B/C/D	0	0.0	36	0.9
Beech 200 Super Kingair	0	0.0	5	0.1
Casa/Nurtanio C212 Aviocar	144	5.0	169	4.2
Cessna 172 Skyhawk	151	5.2	0	0.0
Cessna 208 Caravan	307	10.6	309	7.6
Cessna 406 Caravan Ii	6	0.2	5	0.1
Cessna C206/207/209/210 Stationair	1,599	55.1	3,260	80.7
Cessna C-402/402a	14	0.5	0	0.0
Dehavilland Twin Otter Dhc-6	385	13.3	0	0.0
McDonnell Douglas DC-6a		0.0	1	0.0
Piper Pa-31 (Navajo)/T-1020	165	5.7	251	6.2
Piper Pa-32 (Cherokee 6)	82	2.8	0	0.0
Shorts Harland Sc-7 Skyvan	34	1.2	4	0.1
Volpar Turbo 18	15	0.5	0	0.0
Total	2,902	100.0	4,040	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

Table 62 shows an estimate of the direct operating costs, carrying capacity, and an estimated minimum runway length. Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the related aircraft.

Table 62. Aircraft Direct Operating Cost Estimates, Capacity, and Minimum Runway Length

Aircraft Name	Direct operating cost/hour	Maximum takeoff weight (Pounds)	Maximum payload (Pounds) [1]	Possible passenger seats [2]	Minimum runway length (Feet) [3]
Beech 1900 A/B/C/D	$1,127	17,120	5,775	19	3,900
Beech 200 Super Kingair	$2,816	12,500	4,398	13	4,450
Casa/Nurtanio C212 Aviocar	$1,192	16,975	4,560	19	2,950
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna 406 Caravan Ii	$1,244	9,850	2,768	14	4,050
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
McDonnell Douglas DC-6a	$3,000	97,200	30,000	48 to 56 [4]	4,000
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	NA
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	NA
Shorts Harland Sc-7 Skyvan	$9,986	12,500	5,156	19	3,450
Volpar Turbo 18	NA	8,727	2,552	6	NA

Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008

Notes:

[1] The carrying capacity available for cargo and/or passengers of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight. Also, different versions of the same aircraft specialize in passenger seating or cargo—the Beechcraft 1900C can be configured for passenger seating of 19 or for cargo shipping with a maximum payload of 5,775 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate.

[4] Most DC-6 aircraft are usually equipped to carry freight so they will not have passenger seating.

3.6.4 Community Impacts from Runway Extension

The runway extension improved safety and service for air travel to and from Quinhagak. Hageland Aviation stated that the most significant benefit from the extended runway is improved air service reliability (Thurston, P., 2009). These types of benefits are important for the community of Quinhagak, which is located 71 air miles from the closest inpatient medical facility, in Bethel, Alaska (FAA, 2001).

The runway extension is important to existing commercial fish processing activities in Quinhagak, but it has not had substantial impacts on passenger air and cargo service prices for community residents. Basically, all passenger service is still conducted using the same type of aircraft that were used prior to the runway extension with a few exceptions, such as a handful of Beech 1900 aircraft when the fish processing crews are flying into or out of the community at the beginning and end of the season. In general, air carriers have noted that while a runway extension may allow them to fly in larger aircraft, they are unlikely to do so unless there is a large increase in the number of passengers traveling to a community (Dudley, R., 2009). For example, Yute Air has no plans to add larger aircraft to their fleet because the small Cessna 206 works well for the market they serve. Hageland Aviation Service indicated that if they did fly a larger aircraft to remote communities like Quinhagak they may have to increase passenger fares to cover the added cost of operating a larger aircraft. (Thurston, P., 2009).

The community development quota (CDQ) group, CVRF, strongly supported the runway extension project. CVRF wanted the runway extended so it could be used for flying larger quantities of fresh fish out of Quinhagak. The runway extension helped the fish plant. The plant used to ship about 200,000 pounds per year of fresh fish prior to the runway extension, but these volumes have increased to 400,000 pounds of fresh fish in the past few years. It can be difficult to compete in the commercial fishing market, especially when operating from a location that may be farther from market than others. The CDQ group is able to provide extra funds to subsidize the cost of operating the plant in Quinhagak because it is important to the group that the plant operates and provides fishery-related jobs and income for the region. Due to the subsidy from the CDQ group, the CVS plant is able to compete in the global

marketplace even though some of their operational costs are higher than other processors not located in such a remote region.

Having a longer runway has allowed CVS to fly fish directly from Quinhagak to Anchorage, instead of on a smaller plane (such as a Cessna 206 or 207) from Quinhagak to Bethel, and then on to Anchorage (Hall, J., 2009). Moving fresh fish directly from Quinhagak to Anchorage on a larger plane does two things: it lowers the cost of transporting fish (on a per pound basis), and it allows CVS to move their fish more quickly to Anchorage[8], a very important factor in the transportation of fresh fish. While these products still face competition from more localized sources, the longer runway likely allows high-quality fresh product from Quinhagak to compete with premium product from other sources.

The cost difference for transporting fresh fish changes every year (Hall, J., 2009). Last year, the cost of flying fish out on a smaller plane with service through Bethel was $0.62 per pound to fly from Quinhagak to Bethel, and then another $0.28 per pound to fly from Bethel to Anchorage ($0.90 total).Transporting fish directly from Quinhagak to Anchorage last year cost $0.40 per pound.

Table 63 provides an estimate of the cost difference for shipping 100,000 pounds of fish and 400,000 pounds of fish with the two options. Shipping 100,000 pounds of fish with a large plane costs $50,000 less than shipping the fish with a small plane that requires a connection in Bethel.

Table 63. Estimated Cost Difference for Shipping Fish

	Small plane, connection in Bethel	Large plane, direct to Anchorage	
Pounds Shipped	**$0.90/pound**	**$0.40/pound**	**Cost difference**
100,000	$90,000	$40,000	$50,000
400,000	$360,000	$160,000	$200,000

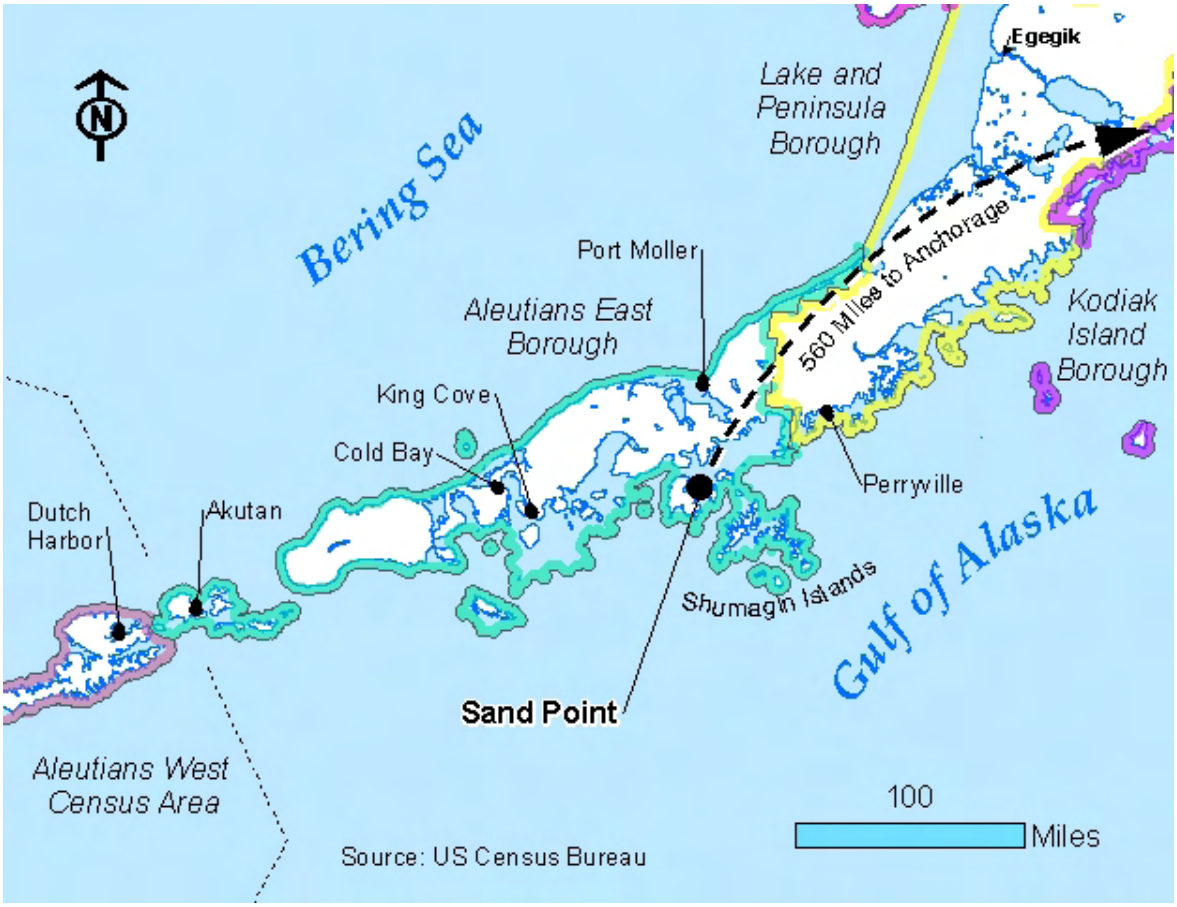
Source: Developed by Northern Economics from Personal Communication with Hall, J., 2009.

[8] Thus providing jobs in Anchorage.

3.7 Sand Point

The City of Sand Point is located on the northwest coast of Popof Island in the Shumagain Island group near the southern coast of the Alaska Peninsula. Popof Island is approximately seven miles wide and nine miles long. Air or marine travel is required to reach other communities. Sand Point is about 560 miles southeast of Anchorage, and 87 miles east of Cold Bay, the major air transportation hub in southwest Alaska. Sand Point's location is shown in Figure 34.

Figure 34. Geographic Location of Sand Point



Source: Alaska Map Company, 2009.

Sand Point was established in 1887 as a trading and cod fishing supply post and fishing remains the basis of the community's economy. Local fishers and processors exploit salmon, halibut, and various types of bottomfish and shellfish. The regional fisheries have expanded over the past 20 years and the community has grown in

response to the increased economic activity. More recently, growth has slowed as fisheries have matured and the resources have become fully exploited.

Over the last two decades, Sand Point's population has fluctuated between the upper 800s to the high 900s (See Table 64).

Table 64. Sand Point Estimated Population, 1990 – 2008

	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sand Point	878	952	921	919	949	910	939	889	992	958

Source: Alaska Department of Labor and Workforce Development. Population Estimates. 2009.

3.7.1 Airport and Public Infrastructure

The Sand Point airport is state-owned, with an updated, grooved asphalt runway that is 5,213 x 150 feet (AirNav, 2009). The runway extension project began in 2001 and was completed in 2004. Before this extension, the Sand Point airport was 4,000 x 150 feet (DCCED, 2009). After the runway extension was complete, the runway had to be realigned because shoreline erosion was washing away the runway safety area and encroaching on the runway. The multi-million dollar runway extension and runway safety area improvements were funded primarily by FAA and ADOT&PF.

Along with the updated airport, Sand Point has a 25-acre boat harbor with four docks, 134 boat slips, a harbormaster office, a barge off-loading area, and a 150-ton lift (Sepez, et al., 2005). According to DCCED, a new boat harbor is scheduled to be constructed at Black Point by the Corps of Engineers. Regular barge services supply the community with goods and fuel. The Alaska Marine Highway System ferry service operates bi-monthly between May and October (DCCED, 2009).

The local electric utility is TDX Corporation, which operates a 2,800 kW capacity diesel generating system (DCCED, 2009). Fuel storage tank owners include Trident Seafoods (642,000 gallons), Shumagin Distributors (1,000 gallons), City (1,000 gallons), Peter Pan Seafoods (1,000 gallons), Reeve Aleutian Airways (1,500 gallons), Aleutian Commercial (2,350 gallons), and Sand Point Electric (40,000 gallons). Total fuel storage capacity is 688,850 gallons.

3.7.2 Local Economy

Sand Point is home to the largest resident fishing fleet in the Aleutian Chain (DCCED, 2009). The state provides employment through the Departments of Public Safety, Fish and Game, and the Alaska Court System. Trident Seafoods operates a major bottomfish, pollock, salmon and fish meal plant, and provides fuel and other services. It employs from 50 to 400 employees, depending on the season (Sepez, et al., 2005). Peter Pan Seafoods owns a storage and transfer station, and there are two other registered small processors in Sand Point (Kohler, C., 2009). The total number of registered fish processors has fluctuated in the past two years with nine registered fish processors in 2005 and four in 2008; however, Trident Seafoods has remained the largest area processor (Kohler, C., 2009). Aleutia is a small custom processor that operates a cooperative of several fishers and sub-contracts with the Trident plant for fish processing. Approximately 116 residents hold commercial fishing permits and many local residents participate in subsistence consumption of fish and caribou.

Approximately 51 percent of the total potential labor force was employed at the time of the 2000 census. About 23 percent of the total potential labor force was unemployed and almost 16 percent of the adult workforce was not searching for employment (DCCED, 2009). These values change significantly during the summer season since Sand Point's economy is dominated by the seasonal commercial fishing industry. In 2000, the median per capita income in Sand Point was $21,954 and the median household income was $55,417 (DCCED, 2009).

In 2008, there were 251 commercial fishing permits held by Sand Point residents and 179 of these permits were fished. The number of active permit holders residing in Sand Point is down from 2000 levels, when 324 permits were held and 200 were fished. Table 65 shows the estimated landings and revenues received for Sand Point commercial fishers for 2000 through 2008.

The actual volume of seafood processed in Sand Point, primarily by Trident Seafoods, is likely in the range of 100 to 115 million pounds annually.[9]

Table 65. Sand Point Commercial Fish Landings and Revenue Estimates, 2000 – 2008

	Crab		Halibut		Herring		Other Groundfish	
Year	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue
2000	202,945	$479,893	906,353	$2,325,355	694,069	$138,813	37,965,430	$7,927,270
2001	113,980	$221,040	791,164	$1,567,009	1,221,603	$208,894	44,758,319	$6,295,468
2002	276,673	$376,218	866,216	$1,750,078	2,023,287	$331,819	33,712,687	$5,066,738
2003	337,918	$768,290	821,583	$2,285,790	926,679	$115,595	31,103,809	$5,937,359
2004	262,674	$681,658	702,149	$1,980,913	0	$0	30,428,614	$4,702,710
2005	301,393	$488,607	530,210	$1,548,251	0	$0	37,141,161	$5,423,944
2006	71,534	$86,522	508,215	$1,841,611	0	$0	31,933,299	$5,866,643
2007	64,950	$110,026	421,438	$1,699,490	0	$0	35,538,693	$6,884,346
2008	759,579	$1,785,467	682,857	$2,077,883	0	$0	35,594,387	$9,219,876

	Other shellfish		Sablefish		Salmon		Grand Total	
	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue	Est. Pounds	Est. Revenue
2000	0	$0	0	$0	13,446,370	$5,767,262	53,215,168	$16,638,592
2001	12,017	$16,364	15,371	$27,678	15,094,196	$2,802,676	62,006,649	$11,139,130
2002	9,551	$11,939	0	$0	10,951,345	$2,286,060	47,839,758	$9,822,852
2003	17,586	$24,269	0	$0	10,317,024	$2,490,863	43,524,598	$11,622,166
2004	19,859	$35,563	0	$0	19,864,961	$4,987,492	51,278,257	$12,388,336
2005	0	$0	0	$0	22,950,149	$6,896,547	60,922,913	$14,357,349
2006	0	$0	0	$0	17,122,195	$5,510,812	49,635,243	$13,305,588
2007	0	$0	0	$0	19,930,623	$7,139,574	55,955,704	$15,833,437
2008	0	$0	0	$0	21,621,243	$7,224,868	58,658,065	$20,308,094

Source: Developed by Northern Economics using proprietary algorithms with data from Annual CFEC Reports, 2009.

3.7.3 Air Carrier Activities

Passenger arrival and departure levels from 2002 through 2008 are shown in Table 66 and Figure 35. Peninsula Airways has been the major passenger carrier for Sand Point for the past several years, and in 2008 provided all passenger air service to and from the community. Passenger arrivals and departures have steadily increased from 2002.

[9] The exact volumes are not available; this range is based on the amounts processed in Naknek and Cordova, based on the understanding that operations in Sand Point are comparable in size.

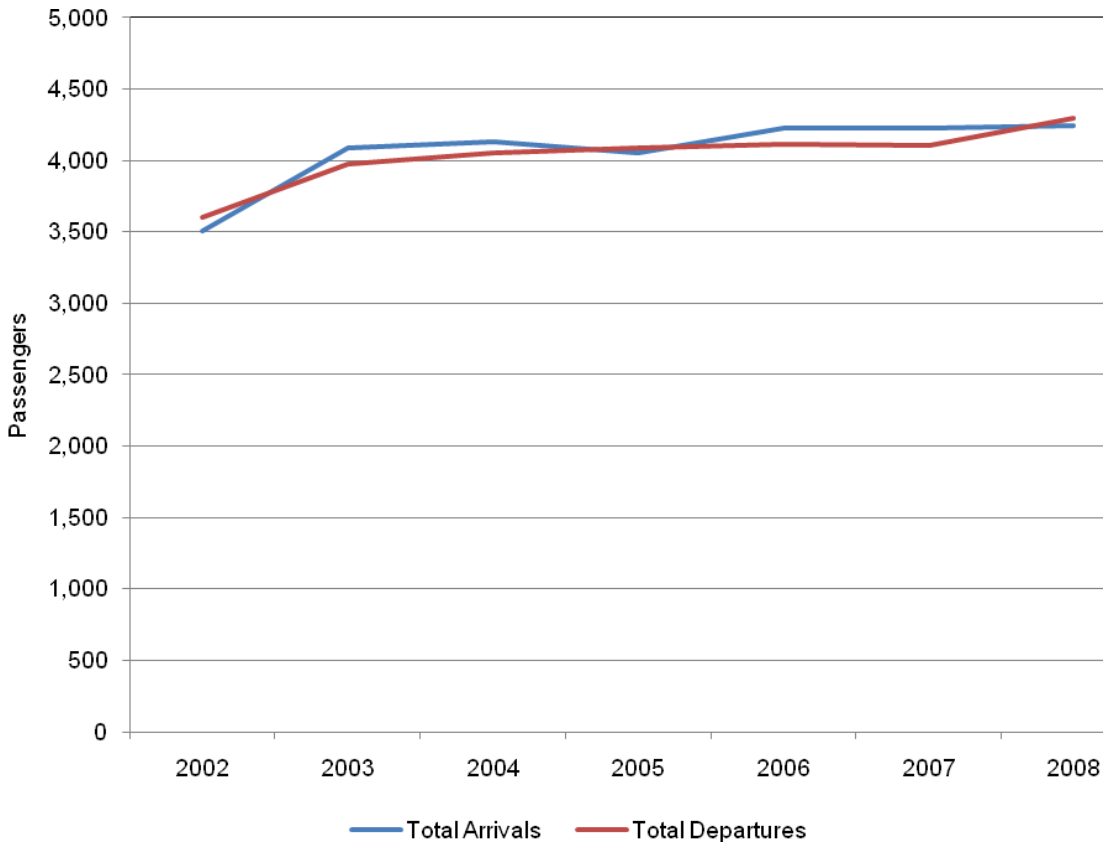
Table 66. Sand Point Passenger Arrivals and Departures in Sand Point, 2000 – 2008

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Passenger Arrivals							
Arctic Circle Air Service	2	3	5	4	0	0	0
Bering Air Inc.	0	0	0	0	0	6	0
Frontier Flying Service	0	0	0	0	57	0	0
Hageland Aviation Service	0	125	0	0	0	0	0
Iliamna Air Taxi	9	9	0	7	10	16	0
Peninsula Airways Inc.	3,495	3,955	4,130	4,045	4,162	4,203	4,243
Servant Air Inc.	0	0	0	0	0	0	0
Yute Air	6	0	0	0	0	0	0
Total Arrivals	3,506	4,092	4,135	4,057	4,229	4,225	4,243
Passenger Departures							
Arctic Circle Air Service	13	11	7	2	3	0	0
Bering Air Inc.	0	0	0	0		10	0
Frontier Flying Service	0	0	0	0	57	0	0
Hageland Aviation Service	0	0	0	0	0	0	0
Iliamna Air Taxi	9	9	0	0	0	0	0
Peninsula Airways Inc.	3,579	3,790	4,048	4,082	4,050	4,087	4,293
Servant Air Inc.	0	0	0	0	7	0	0
Yute Air	1	0	0	0	0	0	0
Total Departures	3,602	3,978	4,055	4,090	4,117	4,105	4,293

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 35. Sand Point Total Passenger Arrivals and Departures in Sand Point, 2000 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The average number of passengers flown to and from Sand Point per flight is shown in Table 67. The number of passengers on flights arriving in Sand Point increased from 5.3 in 2002 to 7.2 in 2008. Similarly, number of passengers on flights departing Sand Point increased from 5.8 in 2002 to 7.2 in 2008. The total number of aircraft departing Sand Point carrying passengers (along with other items such as freight and mail) increased from 698 in 2002 to 1,136 in 2008 (BTS, 2009).

Table 67. Sand Point Average Number of Passengers per Arrival and Departure, 2002 and 2008

Arrivals by Carrier	2002	2008
Arctic Circle Air Service	0.0	0.0
Iliamna Air Taxi	4.5	0.0
Peninsula Airways Inc.	7.1	8.6
Yute Air Aka Flight Alaska	6.0	0.0
Average	5.3	7.2
Departures by Carrier	**2002**	**2008**
Arctic Circle Air Service	0.1	0.0
Iliamna Air Taxi	4.5	0.0
Peninsula Airways Inc.	7.9	8.7
Yute Air Aka Flight Alaska	1.0	0.0
Average	5.8	7.2

Source: Northern Economics calculations based on U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Airfreight is a necessity for delivery of fresh seafood from western Alaska to domestic and international markets. Sand Point fishers and processors use the aviation system to penetrate these markets, but face relatively high airfreight costs (compared to other processor locations) and a limited number of flights on suitable aircraft. For example, Trident Seafoods also has plants located in Kodiak, Cordova, and Southeast Alaska that are all closer to West Coast markets (Trident Seafoods, 2009). Airports in Kodiak and Cordova are both served by large Alaska Airlines jets. Thus, these locations are utilized most often when Trident is serving the fresh fish market. However, depending on the fresh fish market prices and the related fish supply, there may still be a small amount of fresh fish that is shipped out of Sand Point.

Table 68 and Figure 36 provide a sense of fish shipment levels by showing the amount of air cargo received and shipped from the community of Sand Point between 2000 and 2008. Although there are other items being sent as cargo from Sand Point, it is likely that the majority of cargo is fish since this is the main product of the local economy.

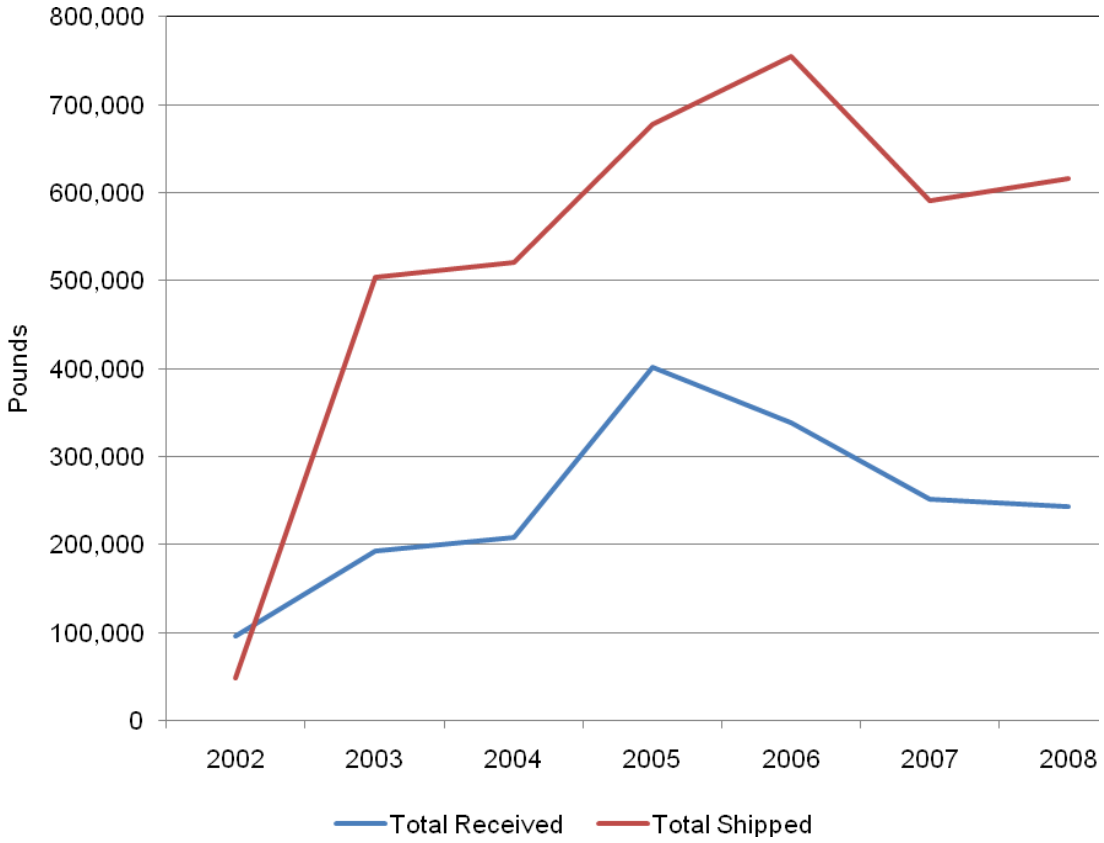
Table 68. Sand Point Cargo Received and Shipped by Air from Sand Point, 2000 – 2008 (Pounds)

Air Carriers	2002	2003	2004	2005	2006	2007	2008
Cargo Received							
Alaska Central Express	2,794	110,389	111,317	204,562	220,384	149,667	157,210
Arctic Circle Air Service	8,920	11,026	23,704	127,017	53,180	0	0
Arctic Transportation	0	0	0	0	4,025	0	0
Hageland Aviation Service	0	0	0	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	33,246	452
Northern Air Cargo Inc.	0	0	0	662	0	0	0
Peninsula Airways Inc.	83,963	63,283	71,789	69,857	58,785	69,411	86,141
Tatonduk Flying Service	0	0	0	0	1,636	0	0
Yute Air Aka Flight Alaska	0	0	0	0	0	0	0
Total Received	95,677	192,731	208,687	402,098	338,010	252,324	243,803
Cargo Shipped							
Alaska Central Express	5	376,275	342,148	409,277	254,591	193,619	157,134
Arctic Circle Air Service	5,410	67,655	136,900	168,525	183,621	0	0
Arctic Transportation	0	0	0	0	0	0	0
Hageland Aviation Service	0	32,784	8,561	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	41,752	146,584
Northern Air Cargo Inc.	0	0	0	59,146	21,314	0	0
Peninsula Airways Inc.	42,338	27,475	33,719	41,546	87,293	122,367	81,822
Tatonduk Flying Service	0	0	0	0	208,355	232,726	230,704
Yute Air Aka Flight Alaska	200	0	0	0	0	0	0
Total Shipped	47,953	504,189	521,328	678,494	755,324	590,464	616,244

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Tatonduk Flying Service is the parent company of Everts Air Alaska and Everts Air Cargo (Everts Alaska, 2009). Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 36. Sand Point Total Air Cargo Received and Sent, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Aleutia Seafood, a small processor whose fishers operate as a cooperative, has a sub-contract with Trident known as “custom processing,” in that they pay Trident a small fee to process their catches. The volume of cargo shipped from Sand Point has been between half a million and three-quarters of a million pounds in the past few years. According to Aleutia Seafood, they send out 10,000 to 20,000 pounds annually in coordination with much larger volumes of fresh fish shipments by Trident (Cumberlidge, B., 2009). However, considering that Sand Point processors likely process over 100 million pounds of fish, processors are sending out a very small volume of fresh fish by air.

Table 69 and Figure 37 show Sand Point air mail volumes from 2002 through 2008. Peninsula Airways and ACE were the main air mail carriers in 2008. Although mail volume fluctuates year to year, mail received volumes are on average five times higher than mail sent.

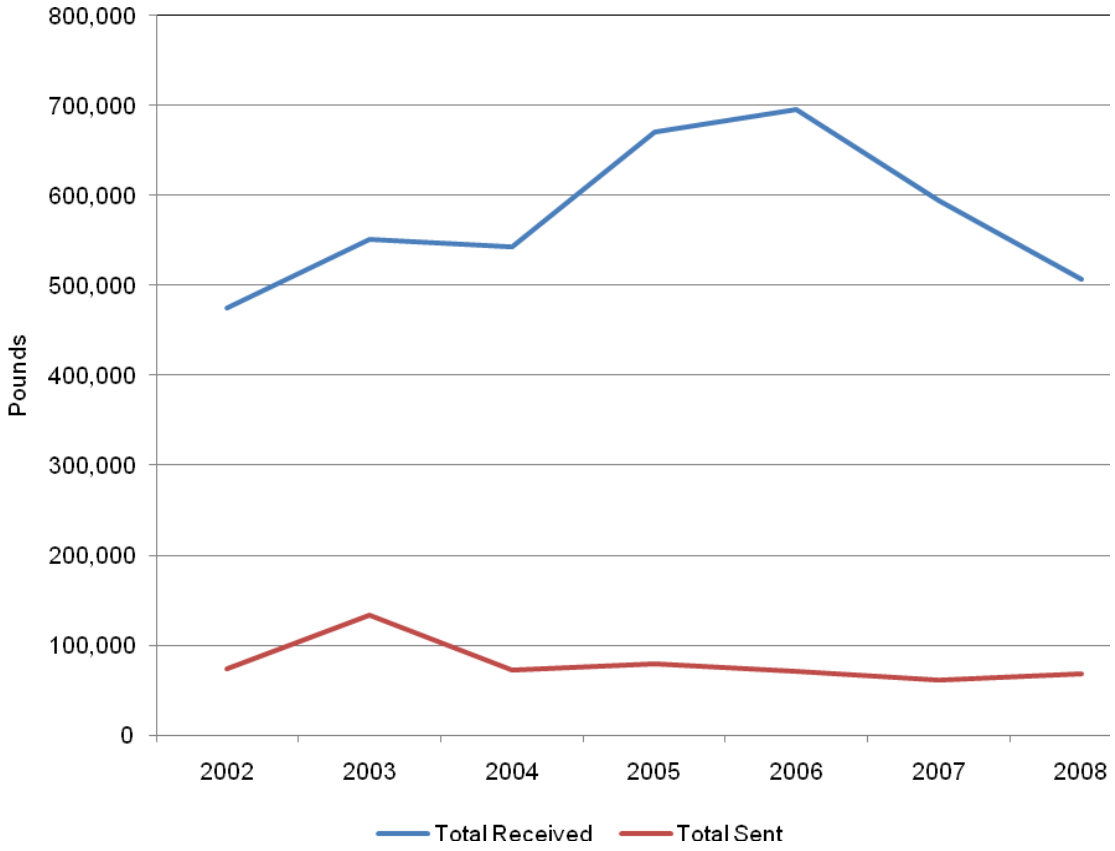
Table 69. Sand Point Air Mail Received and Sent, 2002 – 2008

	2002	2003	2004	2005	2006	2007	2008
Air Mail Received							
Alaska Central Express	15,678	181,812	104,104	90,444	85,231	99,564	71,453
Arctic Circle Air Service	167,005	210,183	192,530	235,719	194,143	0	0
Hageland Aviation Service	0	56,774	44,906	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	174	0
Peninsula Airways Inc.	292,196	103,173	201,071	345,198	416,169	495,222	436,054
Reeve Aleutian Airways	0	0	0	0	0	0	0
Total Received	474,879	551,942	542,611	671,361	695,543	594,960	507,507
Air Mail Sent							
Alaska Central Express	1,054	59,957	3,070	1,444	1,795	3,751	6,423
Arctic Circle Air Service	26,649	32,909	36,267	40,977	28,477	0	0
Hageland Aviation Service	0	7,417	88	0	0	0	0
Lynden Air Cargo Airlines	0	0	0	0	0	0	290
Peninsula Airways Inc.	45,854	32,882	32,591	36,185	40,069	57,129	62,034
Reeve Aleutian Airways	0	0	0	0	0	0	0
Total Sent	73,557	133,165	72,016	78,606	70,341	60,880	68,747

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

Figure 37. Sand Point Total Air Mail Received and Sent, 2002 – 2008



Source: U.S. Department of Transportation, Bureau of Transportation Statistics. T-100 Domestic Market (U.S. Carriers). 2009.

Note: Bureau of Transportation Statistics data for rural Alaska communities for years prior to 2002 are unavailable and/or unreliable (Stankus, B., 2009).

The fleets of air carriers serving Sand Point in 2008 are shown in Table 70. Peninsula Airways and ACE provide the majority of air service in Sand Point.

Table 70. Air Carriers and Fleet Serving Sand Point 2008

	Single Engine		Twin Engine							
Air Carrier Name	Cessna 208 Caravan	Piper Pa-32 (Cherokee 6)	Beech 1900 A/B/C/D	Grumman G-21a (Goose)	Piper Pa-31 (Navajo)/T-1020	Piper T-1040	Saab-Fairchild 340/B	Swearingen Metro III	C-46	DC-6
Alaska Central Express (1)	0	0	4	0	0	0	0	0	0	0
Peninsula Airways Inc. (2)	5	7	0	2	1	1	10	4	0	0
Everts Air Cargo (3)	0	0	0	0	0	0	0	0	2	8
Everts Fuel (3)	0	0	0	0	0	0	0	0	2	3
Total	5	7	4	2	1	1	10	4	4	11

Sources: (1) Hawthorne, G. Alaska Central Express, 2009. (2) Bloomquist, S. (3) Adams, D. Everts Air, 2009.

The types of aircraft being used at Sand Point are shown in Table 71.

Table 71. Sand Point Arrivals by Aircraft Type, 2002 and 2008

Aircraft Name	2002		2008	
	Value	Percent	Value	Percent
Beech 1900 A/B/C/D	35	4.7	175	15.4
Casa/Nurtanio C212 Aviocar	1	0.1	0	0.0
Cessna 208 Caravan	39	5.2	3	0.3
Cessna C-402/402a	134	18.0	0	0.0
Embraer Emb-120 Brasilia	0	0.0	9	0.8
Fairchild Metroliner 23	0	0.0	57	5.0
Lockheed L100-30/L-382e	0	0.0	2	0.2
McDonnell Douglas DC-6a	0	0.0	6	0.5
Pilatus Pc-12	1	0.1	0	0.0
Piper Pa-31 (Navajo)/T-1020	126	17.0	11	1.0
Piper Pa-32 (Cherokee 6)	85	11.4	26	2.3
Piper T-1040	10	1.3	7	0.6
Saab-Fairchild 340/A and 340/B	147	19.8	554	48.8
Shorts 330	0	0.0	1	0.1
Swearingen Metro III	165	22.2	284	25.0
Total	743	100.0	1,135	100.0

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. Air Carriers T-100 Segment (U.S. Carriers), 2009.

Table 72 shows direct operating costs estimates, payload, and runway requirements for several of the aircraft. Direct operating costs are shown only as a point of comparison, and are not the total cost that would be charged for operation of the

related aircraft. Likewise, the minimum runway requirement for an aircraft changes on a case-by-case basis depending upon the weather, airport approach specifics, and load factor.

Table 72. Air Craft Direct Operating Cost Estimates, Capacity, and Minimum Runway Requirements

Aircraft Name	Direct operating cost/hour (1)	Maximum takeoff weight (Pounds)	Maximum payload (Pounds)[1]	Possible passenger seats[2]	Minimum runway length (Feet)[3]
Beech 1900 A/B/C/D	$1,127	17,120	4,375	19	3,900
Casa/Nurtanio C212 Aviocar	$1,192	16,975	5,000	19	2,950
Cessna 208 Caravan	$710	8,000	3,140	9	2,500
Cessna C-402/402a	NA	6,850	2,781	9	NA
Cessna 406 Caravan II	$1,244	9,850	2,768	14	4,050
Cessna C206/207/209/210 Stationair	$352	3,600 to 3,800	1,375 to 1,400	6 to 8	1,500 to 1,800
Lockheed L100 Hercules	NA	155,000	52,204	1[4]	4,850
McDonnell Douglas DC-6a	$3,000	97,200	30,000	48 to 56[5]	4,000
Pilatus Pc-12	NA	10,450	4,583	6 to 8	NA
Piper Pa-31 (Navajo)/T-1020	$617	6,500	2,741	8	NA
Piper Pa-32 (Cherokee 6)	$394	3,400	1,788	6	2,500
Piper T-1040	$1,324	7,000	2617	10	NA
Saab-Fairchild 340/A/B	$1,700	27,275	10,060	34	4,400
Shorts Harland Sc-7 Skyvan	$9,986	12,500	5,156	19	3,450
Swearingen Metro III and Fairchild Metro 23	$1,467	14,500	4150 to 5,760	19	3,900 to 4,400

Sources: AvBuyer, Aircraft Performance Data. 2009. (1) Northern Economics Inc. values developed from on U.S. Department of Transportation, Bureau of Transportation Statistics, 2008.

Notes:

[1] The carrying capacity available for cargo and/ or passengers of each aircraft will vary depending upon the fuel required for a specific flight. For example, maximum payload for the Piper Pa-31 for a 2.5 hour trip is 1,800 pounds because approximately 940 pounds of fuel are required for the flight. Also, different versions of the same aircraft specialize in passenger seating or cargo— the Beechcraft 1900C can be configured for passenger seating of 19 or for cargo shipping with a maximum payload of 5,775 pounds.

[2] The number of passenger seats depends upon the airplane configuration, with some aircraft carrying fewer passengers and more cargo and others more passengers and less cargo.

[3] The minimum runway length is an estimate based on standard FAR 121 requirements (AvBuyer, 2009) and changes depending on several variables such as weather, load, fuel needs, and distance to destination; for example if the runway is shorter than standard for an aircraft, the load can be reduced to compensate for shorter landing or takeoff distance.

[4] Lockheed L100 Hercules aircraft are used primarily for large cargo shipments.

[5] Most DC-6 aircraft are usually equipped to carry freight so they will not have passenger seating.

3.7.4 Community Impacts from Runway Extension

Thus far, the runway extension from 4,000 feet to 5,213 feet has not had a large effect on economic development in the community of Sand Point. Passenger and cargo volumes have not increased substantially since the runway extension was completed in 2004 (see Table 66 and Table 68). Peninsula Airways has not noticed any change in passenger demand since the 2004 extension (Bloomquist, S., 2009). The air carrier has changed the type of aircraft it is using for service to Sand Point; from a smaller Fairchild Metroliner III to the larger Saab 340. The Fairchild Metroliner III has space for 17 passengers and requires a minimum runway length of 3,900 feet, while the Saab 340 can carry up to 30 passengers and requires a minimum runway length of 4,400 feet. Peninsula Airways reported that this change was not due to an increased customer demand in Sand Point, but because the airline needed to retire several of its Metroliners for safety reasons, and the Saab 340 was their chosen replacement aircraft (Bloomquist, S., 2009).

The main engine of the Sand Point economy is commercial fishing. The volume of fish shipped via air has not increased dramatically since the runway extension—total cargo shipped in 2003 was 504,000 pounds; 521,000 in 2004; and in 2007 and 2008, shipments were 590,000 pounds and 616,000 pounds, respectively. The runway extension has likely had some impact on the amount of fresh fish flown out of Sand Point. However, considering that the amount of fish processed in Sand Point is likely over 100 million pounds, and at a maximum there is 500,000 to 750,000 pounds of fish being flown out of Sand Point (in reference to shipped cargo volumes shown in Table 68), the amount of fresh fish flown out is very small.

According to Aleutia, shipping costs have decreased in recent years because of the runway extension. Prior to the extension, maximum loads were 3,000 to 5,000 pounds at a cost of $0.75 to $0.80 per pound. After the extension, loads range from 20,000 to 25,000 pounds at a cost of $0.50 per pound. The smaller loads were handled by ACE using a Beech 1900 (maximum payload of 5,000), or Peninsula Airlines with the Cessna 208 Caravan or Fairchild Metroliner III. Now, Trident and Aleutia can utilize Everts or other carriers with larger aircraft like Lynden Air Cargo to

transport their fish from Sand Point. In addition, it is common for passenger carriers to transport extra air cargo including fish on their passenger flights.

Table 73 provides an overview of the effect of the runway length on the costs of shipping fish out of Sand Point by air. A low and a high range of pounds shipped are provided since the exact amount of fresh fish flown out of Sand Point is unknown. The cost difference is based on flying fish out on a smaller aircraft such as those described above or a larger aircraft, from Sand Point to Anchorage.

Table 73. Estimated Effect of Runway Length on Shipping Fish from Sand Point

	Small plane	Large plane	
Pounds Shipped	**$0.8/pound**	**$0.5/pound**	**Cost difference**
100,000	$80,000	$50,000	$30,000
500,000	$400,000	$250,000	$150,000

Source: Cumberlidge, B. 2009. With Northern Economics Analysis.

4.0 KEY FINDINGS

The purpose of this project was to analyze the effect of longer runways on the economic development of rural Alaska communities. The results of the community case studies completed for this analysis show that in order for a runway extension to increase the economic development of a community, there must be economic activities prior to the runway extension that will generate higher volumes of cargo or numbers of passengers due to the lower transportation costs associated with larger aircraft using the runway. Without such aviation-responsive economic activity, a runway extension has little effect on a community's economic development.

However, the case studies' results show that runway extensions create the following potential benefits for remote Alaska communities:

- Improved service reliability
- Increased safety
- Reduced cost of flying fuel to communities

A runway extension can be critically important for improving the reliability and safety of air service at an airport. For remote villages, air service is the only way to access emergency medical services, so improved air service reliability has the potential to save lives. In addition, a runway extension can be very important for communities that rely on air transportation of fuel by allowing larger planes to access the airport, which can reduce the per-gallon cost of flying the fuel to the community. The improved reliability of air carrier service from a runway extension also increases the likelihood that fuel can be delivered quickly when shortages unexpectedly arise. In the long run, improvements to the state's transportation infrastructure can make a significant reduction in the cost of importing energy and other goods, which would then result in lower living costs and higher standards of living.

Runway extensions create additional potential benefits for air carriers:

- Reduced cargo shipping/transportation costs
- Reduced operating costs for passengers and bypass mail flights.

These benefits are more dependent on the volume of cargo/mail/passengers transported than a runway extension itself. If volumes support the use of larger aircraft, a runway extension would enable carriers to realize economic efficiencies to transport cargo, mail, and passengers. It would be up to the carriers to pass those cost savings on to the customers (the communities).

Runway length is a critical element of airport planning and development. The 1996 Alaska Aviation System Plan recommended a runway length for Community Class Airports of 3,000 feet. The statewide standard for Community Class runway lengths was changed from 3,000 feet to 3,300 feet in response to Change 6 in FAA Advisory circular 150-5300, which required a runway length of 3,200 feet for non-precision instrument flight approaches. The department's 3,300-foot statewide standard resulted from an additional 100 feet being added to the 3,200-foot minimum FAA standard, to accommodate variation in temperature and elevation. The 3,300-foot minimum standard has since guided airport development at many rural airports.

This analysis does not find a single runway length which guarantees all of the potential benefits discussed in this report to every community. Because the actual benefits realized by a community are dependent on a great many factors, the state may choose to evaluate runway length requirements for each airport on a case-by-case basis. Airport master plans, airport layout plans, and regional transportation plans may consider airport and community-specific factors such fleet mixes, stage lengths, elevations, temperatures, economic vitality, and other factors in determining the most appropriate runway length for each community.

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